IntelliGaze™
Installation & Service Manual

DocVersion: 3.0

alea technologies

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Please observe the proper use of this product. Failure to do so will render the warranty void. Do not subject this product to direct sunlight, moisture or shock. The following environmental conditions are required:

Ambient temperature: 0°C ... 45°C (32°F ... 113°F)
Storage temperature: -20°C ... 60°C (-4°F ... 140°F)

THE INTELLIGAZE SYSTEM IS NOT INTENDED FOR USE IN THE OPERATION OF NUCLEAR FACILITIES, AIRCRAFT NAVIGATION OR COMMUNICATION SYSTEMS, AIR TRAFFIC CONTROL SYSTEMS, LIFE SUPPORT MACHINES OR OTHER EQUIPMENT IN WHICH THE FAILURE OF THE INTELLIGAZE SYSTEM COULD LEAD TO DEATH, PERSONAL INJURY, OR SEVERE PHYSICAL OR ENVIRONMENTAL DAMAGE.

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Table of Contents

1 Introduction 5

2 Technical Specification 6

2.1 Tracking System - IG-30 6
2.2 Tracking System - IG-30NT 6

3 Safety & Compliance 8

3.1 Safety of the Infrared Illumination 8
3.2 Magnetic Field Hazard 8
3.3 Epilepsia / Photosensitive Seizure Warning 8
3.4 CE Certificate 9
3.5 FCC 10

4 Setup 11

4.1 IntelliGaze™ CAM30 Camera Unit 11
4.2 IntelliGaze™ CAM30NT Camera Unit 12
4.3 HW-Requirements 14
4.3.1 PC-Platform 14
4.3.2 Monitor 15
4.3.3 Tools 16
4.4 Camera Mounting Options 17
4.4.1 'Standard' VESA-Adapter - 'No.1' 17
4.4.2 EZCom VESA-Adapter – 'No.2' 18
4.4.3 Sliding VESA-Adapter – No.3 19
4.4.4 Mobi2 by jabbla - Adapter 20
4.4.5 Tellus4 by jabbla - Adapter 21
4.5 Hardware Assembly /Std. VESA Adapter 22
4.5.1 Hardware Integration Examples 25
4.6 Software 27
4.6.1 Platform Prerequisites 27
4.6.2 IntelliGaze™ Software Installation 27
4.6.3 Camera Driver 28
4.6.4 Licensing 29
4.6.5 Service Mode Options 29
4.7 Monitor Calibration 30
4.8 System Validation 30

5 Using IntelliGaze™ 31

5.1 Principle of operation 31
5.2 Environment 31
5.3 Special Cases 32
5.3.1 Glasses 32
5.3.2 Monocular Operation 32
5.3.3 Calibration area 33
5.3.4 Cerebral Palsy 33
5.4 Monitor Calibration 33
5.5 Tracking Status Indicator 35
5.5.1 Hardware Error Codes (CAM30NT only) 36
5.6 Operation Modes 36
5.6.1 Assisted Access 36
5.6.2 Safe Access 37
5.6.3 Full Access 38
5.7 General Use --> see Quickstart Guide 39

6 IntelliGaze™ Reference 40

6.1 Overview....40
6.2 System Hotkeys....41
6.3 Desktop Control....42
6.3.1 Side Menus 43
6.3.2 Integrated Keyboard 47
6.3.3 Magnifier 48
6.4 Operation Center....49
6.4.1 Calibration 50
6.4.2 Options 52
6.5 IntelliGaze Preferences....59
6.5.1 General Options 59
6.5.2 Calibration 61
6.5.3 Input 63
6.5.4 Integrated Keyboard 65
6.5.5 Operation Center 65
6.5.6 Application Center 66
6.6 Service Mode....69

7 Adapting IntelliGaze to Different Applications 72

7.1 Blickfang™ Concept....72
7.2 Windows Desktop Settings....73
7.3 Application Center - General Considerations....74

8 IntelliGaze Software Update 75

8.1 Update from CD....75
8.2 Online-Update....75

9 Gaze Assistant 76

9.1 General....76
9.2 Usage....76
9.2.1 User Profile Selection 76
9.2.2 Target Selection 76
9.2.3 Fixation Test 78
9.2.4 Field of View Test 79
9.2.5 Blink Test 80
9.2.6 Calibration 80
9.2.7 Report 81

10 Troubleshooting 82

10.1 General....82
10.1.1 System is not tracking 82
10.1.2 Intelligaze cannot detect camera on start-up 82
10.1.3 'Measure the monitor before calibration error' 83
10.1.4 Dwell click is never triggered 83
10.1.5 IntelliGaze crashed 83
10.2 Hardware....84
10.2.1 Cleaning system components, CAM30 84
10.2.2 Cleaning system components, CAM30NT 84
10.2.3 Check and adjust lens focus (CAM30) 85
10.2.4 Software 86

11 Notes 87

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1 Introduction

This manual targets system integrators and support personnel who require in-depth knowledge regarding the IntelliGaze™ software and hardware. It is meant to accompany an on-site training session.

It covers system specifications and general hardware setup aspects as well as software installation instructions.

The software reference documents all settings of the IntelliGaze™ software and provides the default (installation) values for reference.

3rd-party software integration is explained and several cases are documented with their recommended parameters.

Typical troubleshooting cases are mentioned in the last part of this manual.

Please feel very welcome to contact alea technologies with any request or suggestion that has not been covered in this manual.

For programming references regarding the IntelliGaze™ API, please refer to the *'IntelliGaze™ API Documentation'* which is available for registered developers.

2 Technical Specification

2.1 Tracking System - IG-30

Tracking technology	Hybrid infrared video eye- & head-tracking. Binocular & monocular tracking
Working Volume centered at 600 mm distance	300 x 200 x 200 mm^3 [WxHxD]
Accuracy, static	0.5° typically
Accuracy, over full working volume	1° typically
Sampling Rate	50 / 40 / 30 / 20 Hz
Max. head-movement velocity	15 cm/s
Recovery-time after tracking loss (head moved to quickly or was out of range)	40 ms (@50 Hz)
System Dimensions	ca. 300 x 45 x 80 mm3 [WxHxD]
Mounting Options	on monitor via VESA-adapter on Tablet-PC via customized interfaces
System Weight	ca. 850g
Interface	Full-Speed USB2
Power-Supply	Desktop power supply provided with standard system: prim. 230 / 110 VAC - sec. 15..19V, 3A
Power consumption (50 Hz full tracking mode)	USB: ca. 200mA Power-Supply: avg. 150mA @15V

2.2 Tracking System - IG-30NT

Tracking technology	Hybrid infrared video eye- & head-tracking. Binocular & monocular tracking
Working Volume centered at 620 mm distance	320 x 200 x 250 mm^3 [WxHxD]
Accuracy, static	0.5° typ.
Accuracy, over full working volume	1° typ.
Sampling Rate	40 / 30 / 20 Hz
Recovery-time after tracking loss (head moved to quickly or was out of range)	150 ms typ.
System Dimensions	285 x 44 x 38 mm^3 [WxHxD]
Mounting Options	on monitor via VESA-adapter on Tablet-PC via customized interfaces
System Weight	ca. 280g
Interface	Full-Speed USB2
Power-Supply	Single USB cable, up to 1m (optional aux. power supply for special setups)
Power consumption (40 Hz full tracking mode)	< 2,5W avg.

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3 Safety & Compliance

The IntelliGaze™ IG-30 and IG30NT systems have been certified for general office use as in the class of information and telecommunication devices. The system will meet or exceed the required standard according to the CE certification below.

3.1 Safety of the Infrared Illumination

The IG-30 and IG-30NT camera system contains LED sources that emit light in the near infrared (NIR) spectrum. The light emission levels have been measured and calculated to comply with the European laser safety standard EN60825-1.

The standards contain test procedures to verify that the emitted light will cause no thermal injury to the eye of a person being exposed to the light. The product is classified as a Class 1 LED product and complies with the standards for long-time exposure.

Exposure varies with the chosen frame-rate and working distance. For comparison reason: the user will be exposed to about 200µW/cm^2 at 40Hz tracking rate in the suggested operating distance of 600mm.

3.2 Magnetic Field Hazard

The CAM30 / CAM30NT units contain magnets. Magnetic fields may interfere with the function of cardiac pacemakers and implantable defibrillators.
As a general rule, please maintain a minimum distance of 10 cm (4 inches) between the frontal part of the device and any implanted, electronic device.

3.3 Epilepsia / Photosensitive Seizure Warning

A very small percentage of people may experience a seizure when exposed to certain visual images, including flashing lights or patterns that may appear in video games. Even people who have no history of seizures or epilepsy may have an undiagnosed condition that can cause these photosensitive epileptic seizures while using a gaze interaction device on a computer screen.

These seizures may have a variety of symptoms, including lightheadedness, altered vision, eye or face twitching, jerking or shaking of arms or legs, disorientation, confusion, or momentary loss of awareness. Seizures may also cause loss of consciousness or convulsions that can lead to injury from falling down or striking nearby objects.

Immediately stop while using a gaze interaction device on a computer screen and consult a doctor if you experience any of these symptoms. Parents should watch for or ask their children about the above symptoms - children and teenagers are more likely than adults to experience these seizures.

The risk of photosensitive epileptic seizures may be reduced by taking the following precautions:

- Using a gaze interaction device on a computer screen only in a well-lit room.
- Do not use a gaze interaction device on a computer screen if you are drowsy or fatigued.

If you or any of your relatives have a history of seizures or epilepsy, consult a doctor before playing.

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3.4 CE Certificate

Declaration of Conformity

We, **alea technologies gmbh**

Potsdamer Str. 18a, 14513 Teltow, Germany

declare under our sole responsibility, that the product

IntelliGaze™, IG-30, IG-30pro, IG-30NT
using the CAM30 or CAM30NT camera units

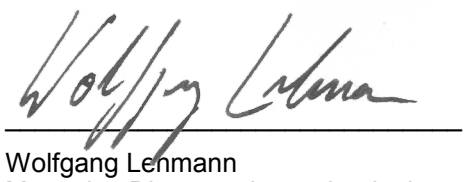
to which this declaration relates is in conformity with the following standards or other normative documents:

EN55022:2008, class B	*EMC, emission*
EN55024:2003	*EMC, Immunity*
EN60950	*Electrical Safety*
EN60825-1	*Laser Safety*

following the provisions of Directive 89/336/EWG (EMC) and 73/23/EWG (LVD).

The IntelliGaze™ IG-30 system serves a gaze-controlled computer input device for physically handicapped persons.

Teltow, October 30th 2012



Wolfgang Lenmann
Managing Director, alea technologies gmbh

3.5 FCC

IntelliGaze™ CAM30, CAM30NT camera system

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

alea technologies is not responsible for any radio or television interference caused by cables and connectors other than those recommended by or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

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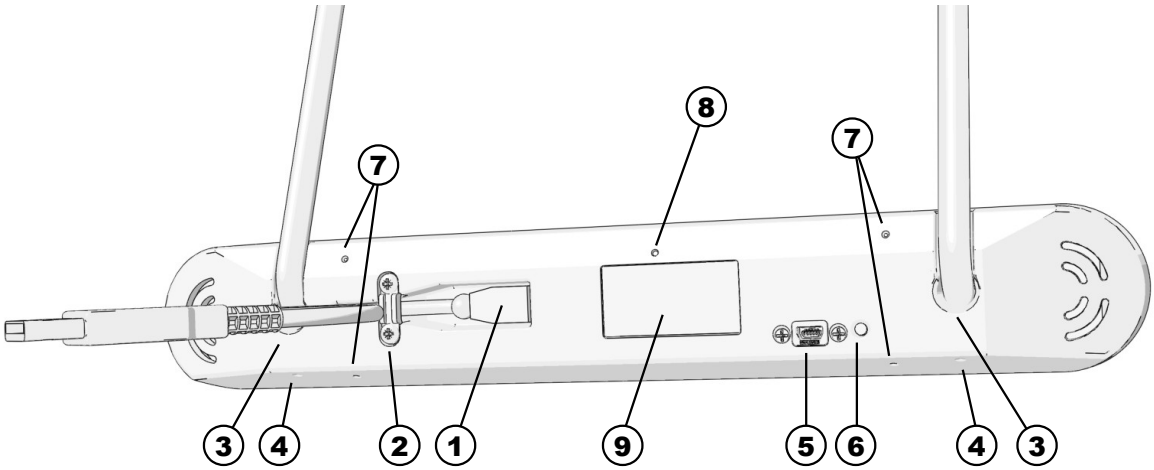
4 Setup

4.1 IntelliGaze™ CAM30 Camera Unit

The camera unit does not contain any adjustable or serviceable parts!
Do not open the housing!

4.2 IntelliGaze™ CAM30NT Camera Unit

> ⚠ **The camera unit does not contain any adjustable or serviceable parts.**
> **Please do not open the housing!**



1	USB2 connector (mini-USB)
2	Cable lock
3	Standard CAM30(NT) mount D:8mm → Max. depth: 35mm.
4	Std. Mount lock screws. → Please, only tighten hand-tight!
5	Optional auxiliary power-supply connector. (mini-USB) → Only required with very long main USB cable, adds to P.1 → Do only use manufacturer supplied power-supplies.
6	System status LED (see below)
7	Aux. camera mounting threads (M3, max. length 8mm)
8	Internal camera status LED (see below)
9	Camera label, warranty seal.

System Status LED [6]

green	IntelliGaze is running and camera functional.
yellow	IntelliGaze is running but camera functions are constricted*.
red	Camera stopped working because of a critical error* Device requires service, contact your distributor.
	/* IntelliGaze Tracking Status Indicator of IntelliGaze will give more details about the error

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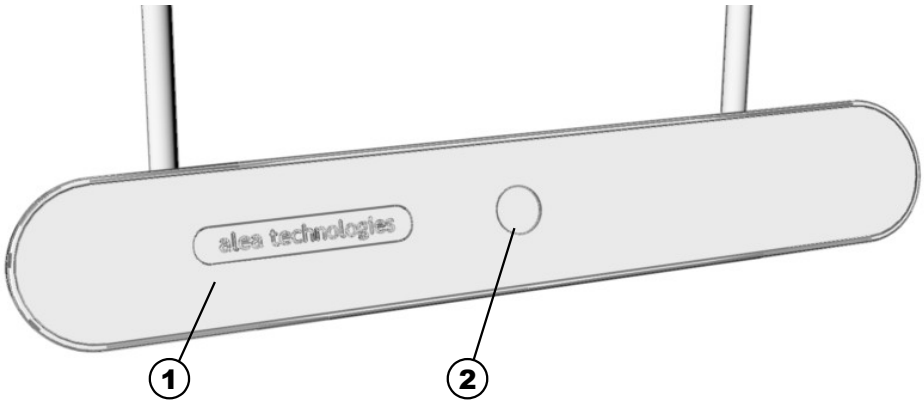
Internal Camera Status LED [8]

orange	Camera driver is properly installed.
off	Camera driver is not loaded, check the Windows device manager and reinstall driver or plug camera into a different USB port.



1	Front plate. IR-transmissive acrylic glass. → use only soft cloth, i.e. microfiber and avoid harsh cleaners.
2	IR-glass lens. → Please keep the lens clean. Dirt may be removed with glass cleaner or better isopropanol. The use of a cotton swab is recommended.

4.3 HW-Requirements

4.3.1 PC-Platform

While every current notebook, tablet or desktop PC should be powerful enough to run IntelliGaze™ in the background, we specify the minimum requirements as follows:

CPU:	core i3 or AMD equivalent, Atom Z3XXX	
	For media operations and gaming we recommend four logical CPU cores.	
RAM:	Windows XP:	512 MB (1GB recommended)
	Windows VISTA / 7 / 8 :	1 GB (2GB recommended)
Ports:	1 available full-speed USB2 port.	
OS:	Windows 7 (32 and 64 bit) Windows 8 (32 and 64 bit) (Windows VISTA SP2 – last supporting IntelliGaze version: v3.0) (Windows XP SP3 – last supporting IntelliGaze version: v2.5)	

3rd party software that sometimes uses excessive hardware resources while operating in the background, like some virus scanners or similar, can increase the minimum hardware requirements significantly.

Other attached USB devices may negatively influence the gaze tracking performance. Please consider this carefully and whenever possible, test the compatibility in advance. We highly recommend connecting the camera system to a dedicated USB2 port on the computer rather then through a USB-Hub.

CAM30: do not extend the USB cable length longer than 2m and use o ly USB2 certified, high quality cable.

CAM30NT: do not extend the USB data cable length longer than 1m. When using the additional power-supply, do not extend the length of USB cable more than 2m.

Prefer a custom, long cable over extensions, as the connectors will negatively influence the achievable maximum length.

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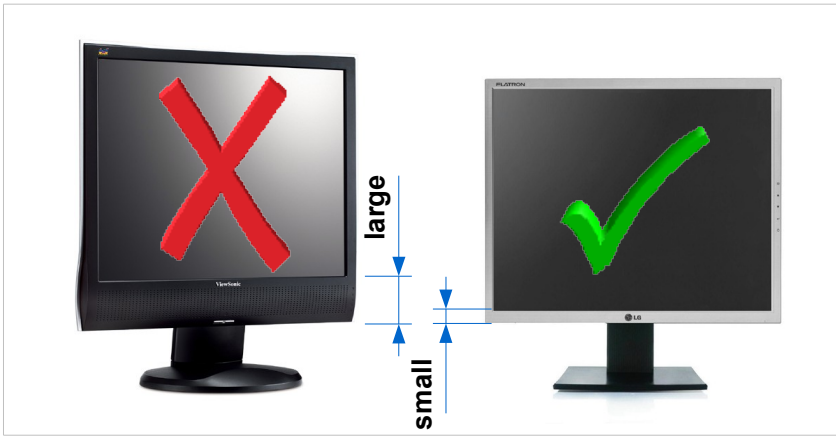
4.3.2 Monitor

Technical Requirements

Screen size:	TFT monitors 12″ to 19″wide-screen.
Mounting:	VESA75 or VESA100 compatibility (for IG-30/30NT VESA adapters)

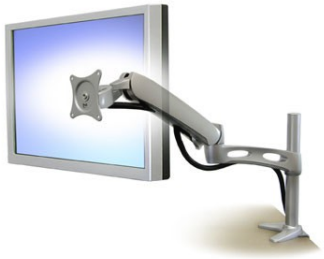
In general most monitors that comply with the requirements above should work with the IG-30 or IG-30NT system.

One issue to consider when selecting a monitor is the width of the bottom screen-border (→ see sketch below). A large border, which forces the camera unit further away from the active screen region, might prevent accurate tracking on the upper parts of the screen. For the above reason screens with speakers integrated at the bottom should be avoided.



Some VESA-mounts might require a custom spacer or special screws to integrate safely with the standard VESA adapter provided with the IG-30 or IG-30NT system.

In most cases it is highly recommended to use a monitor arm, such as the Ergotron-LX (→ see image), to mount the monitor and camera units as flexibly as possible. Nevertheless, several, particularly height adjustable, desk-mounts allow integration without the use of a monitor arm.



When in doubt, feel free to ask for our list of recommended monitors, or inquire about a particular model before making a purchase. alea technologies will also be pleased to provide monitor arms, desktop mounts or customized solutions on request.

4.3.3 Tools

The assembly and service of the system may require several tools:

CAM30

Tool	Part of Demo-Unit	Purpose
Allan / Hex Key 0,9 mm	Yes	CAM-30, re-adjust lens calibration. *see: p.85*
Allan / Hex Key 1,5 mm	Yes	CAM-30, fixate housing. *see:p.24*
Allan / Hex Key, 2mm	Yes	VESA-Mount, fixate aluminum rods *see: p.23*
Metric Ruler or Measuring Tape, 50 cm	No	Monitor Calibration
Screwdriver, div.	No	Depending on Monitor & Arm.

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4.4 Camera Mounting Options

alea technologies can provide several custom mounting adapters to cover the majority of arising mounting challenges.

While several adapters attach between VESA 75/100 mounts of the monitor and, i.e. a desktop arm, some integrate more closely with dedicated communication devices, i.e. the Tellus 4.

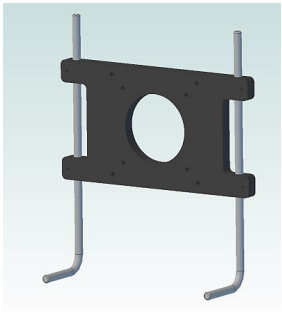
More recently, some adapters have been adopted to carry the new CAM30NT model which maintains the general mounting scheme, but requires slight horizontal adjustments due to the reduced camera depth. Please find details below.

4.4.1 'Standard' VESA-Adapter - 'No.1'

This was the first adapter, that alea technologies provided.

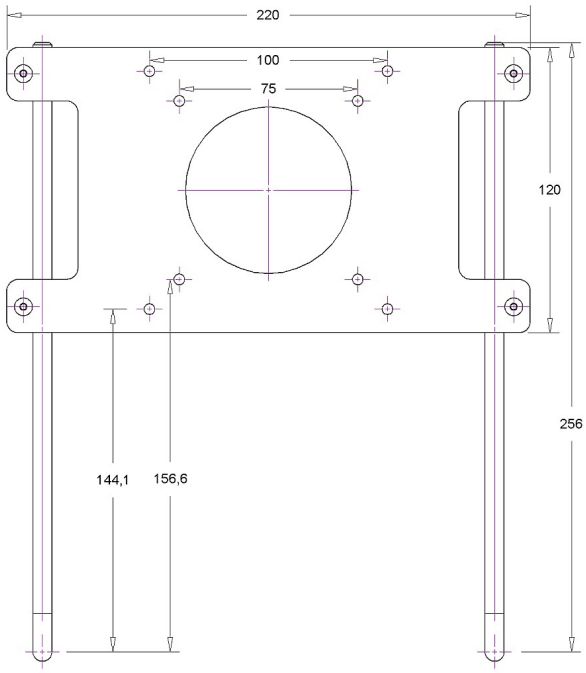
This adapter attaches to small computers and TFT screens which provide a 75/100mm VESA mounting option. The mounting height can be adjusted in a very large range.

Mount:	VESA 75/100
Thickness (add to screw length):	12mm
Camera Interface	2x 8mm
Compatible Cameras	Cam30, Cam30NT
Maximum Mounting Height*:	156mm$_{VESA75}$ / 144mm$_{VESA100}$
Minimum Mounting Height*:	---



** Mounting Height: distance between lower VESA-Screw and center of 8mm rod.*

Shorter aluminum rods, in particular for 12"Tablet computers can be provided on request.



4.4.2 EZCom VESA-Adapter – 'No.2'

This is a fixed adapter specially designed for the ATS EZCom device. The adapter also fits alea technologies IG.Com 12" panel computer.

Mount:	VESA 75
Thickness (add to screw length):	4mm
Camera Interface	2x 8mm
Compatible Cameras	Cam30, Cam30NT**
Mounting Height*:	$116mm_{VESA75}$

** Mounting Height: distance between lower VESA-Screw and center of 8mm rod.*
*** Extended dowel pins are available to mount the slimmer camera more forward.*

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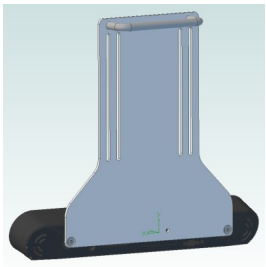
4.4.3 Sliding VESA-Adapter – No.3

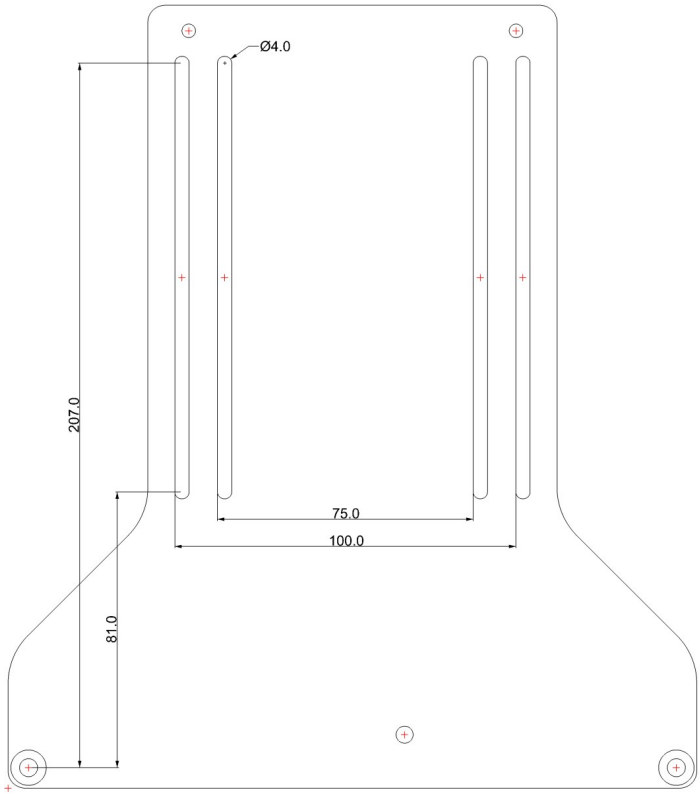
With the release of the new camera model, targeting slimmer PC platforms, the Sliding VESA-Adapter, No.3 has been designed.

It fits even small platforms, like the WeGo 10" SGD and provides a convenient, robust handle to move the system around easily.

Mount:	VESA 75/100
Thickness (add to screw length):	3mm
Camera Interface	2x 8mm
Compatible Cameras	CAM30NT**
Max.Mounting Height*:	$107mm_{VESA100}$, $132mm_{VESA75}$
Min.Mounting Height*:	$81mm_{VESA75/100}$



** Mounting Height: distance between lower VESA-Screw and center of 8mm rod.*
*** Different dowel pins [32 / 50 mm] are available to mount the camera flush with the screen.*



- As of Feb.2013, this part is still under market evaluation. Color option is silver only -

Please ask for samples or adaptations.

4.4.4 Mobi2 by jabbla - Adapter

This adapter has specifically been designed to fit jabbla's Mobi2 communication device. It replaces the original Daessy adapter plate while maintaining it's functionality.

Mount:	Mobi2
Thickness (add to screw length):	n.a.
Camera Interface	2x 8mm
Compatible Cameras	Cam30NT
Max.Mounting Height*:	n.a.
Min.Mounting Height*:	n.a.

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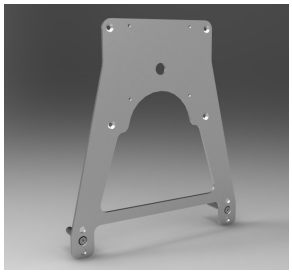
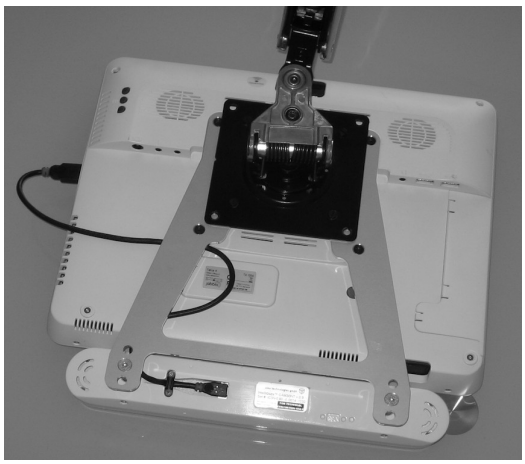
4.4.5 Tellus4 by jabbla - Adapter

This adapter has specifically been designed to fit jabbla's Tellus4 communication device. It replaces the original Daessy adapter plate while maintaining it's functionality.

Mount:	Tellus4
Thickness (add to screw length):	n.a.
Camera Interface	2x 8mm
Compatible Cameras	CAM30, Cam30NT**
Max.Mounting Height*:	n.a.
Min.Mounting Height*:	n.a.



*** Extended dowel pins are available to mount the slimmer camera more forward.*



4.5 Hardware Assembly /Std. VESA Adapter

During hardware installation, the camera and monitor will be combined into a stable module, which may then be mounted on a monitor-arm or desk-stand.

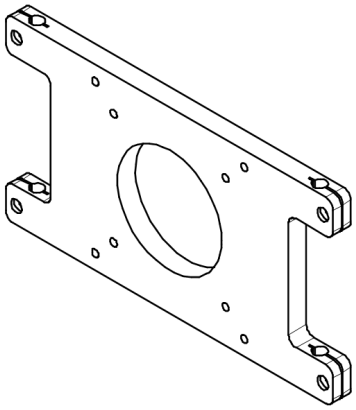
This section explains the general principle of assembly, as the actual process may vary depending on the selected monitor.

Standard TFT & CAM-30 VESA-Adapter

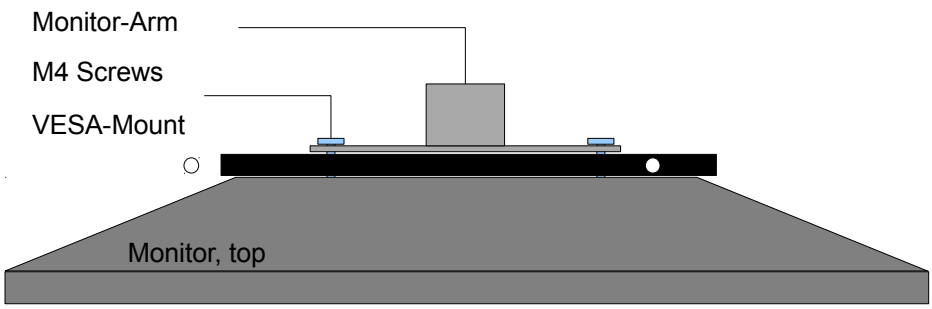
Required Tools: - Screwdriver depending on monitor-arm.

- 1,5 mm and 2 mm Allan/Hex keys (provide with the system).

The standard VESA adapter is implemented as a VESA-75&100 spacer. The adapter will be mounted between a typical monitor's VESA-Interface and a monitor-arm. The adapter is 12mm thick, and the screw-length should be selected accordingly.



Please make sure that longer screws do not damage the interior of your monitor !



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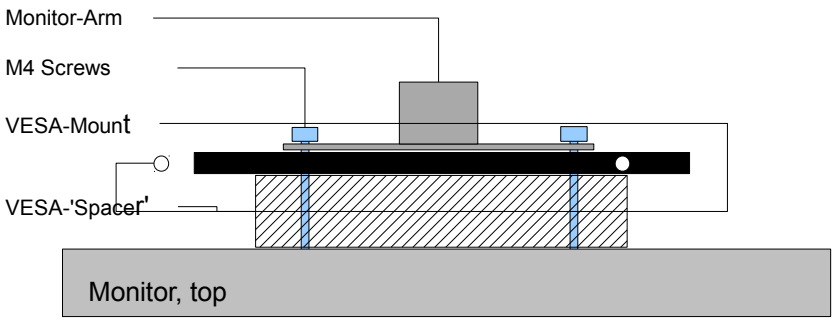
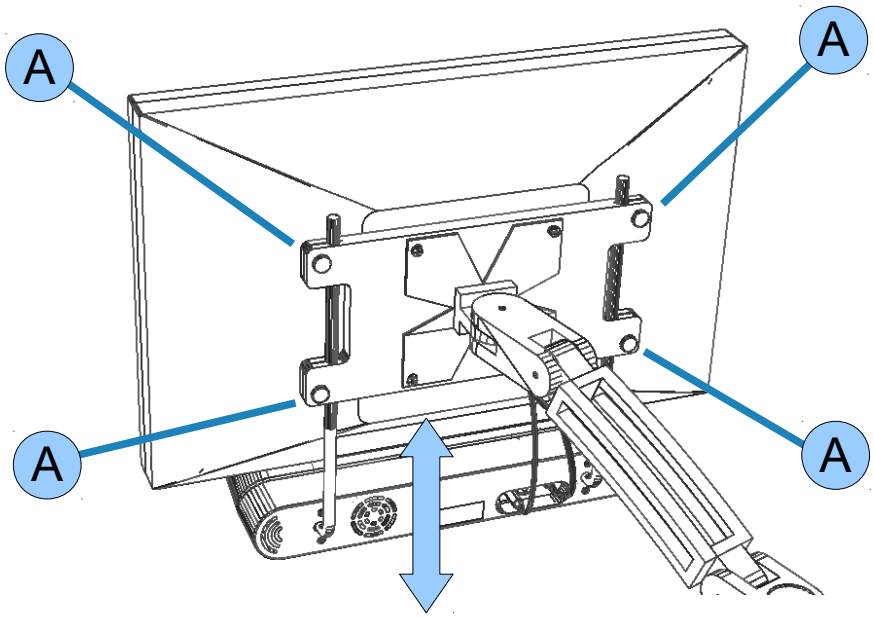
Very slim monitors, in particular Tablet-PCs, may benefit from the use of a custom spacer that will allow more space between the VESA-adapter and the front of the device.



Once the adapter has been mounted on the back of the monitor and the monitor has been attached to a monitor-arm or desktop-mount, the aluminum rods can be inserted and roughly adjusted.

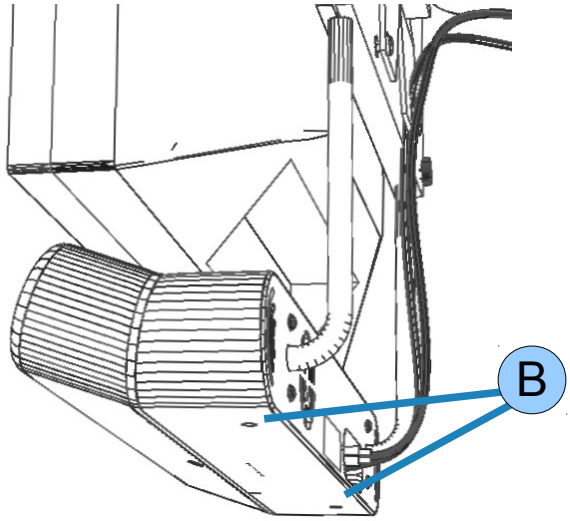
Please make sure that the monitor is mounted stably and attach the CAM-30 unit underneath by inserting the rods into the appropriated mounting holes in the back of the device.

The camera should be adjusted so that it is centered and parallel to the front of the monitor, as close to the bottom of the screen as possible.



A: Thumb-Screw or Screws for 2mm Allan/Hex.
Please use limited force when tightening!

After adjusting the vertical distance, the horizontal position must be set. The camera can be firmly locked in place by tightening the hidden screws [B].



B: Hidden Lock-Screws, use 1,5mm Allan/Hex key.

The hardware installation is completed by connecting the USB cable to a USB2-port on the PC and connecting the provided power-supply.

When using USB2 extension cables, make sure to use USB2 certified cables, and be certain that the combined length does not exceed maximum length of 3m. Use USB2 hubs only when required and carefully examine the system performance.

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4.5.1 Hardware Integration Examples

Asus EEE Slate EP121

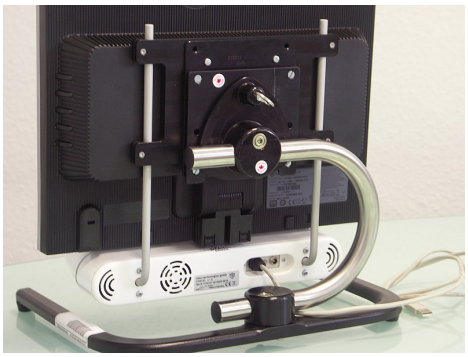
Mobi2

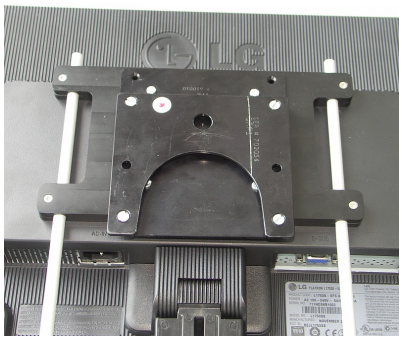
CAM30NT on Powerbox7

12" PaceBlade Tablet-PC on Wheelchair & Desk-Mount / DAESSY parts

15" Panel-PC on Desk-Mount

17" TFT-Monitor on Desktop-Mount with Quick-Release / DAESSY parts





CAM30NT on 19" TFT

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4.6 Software

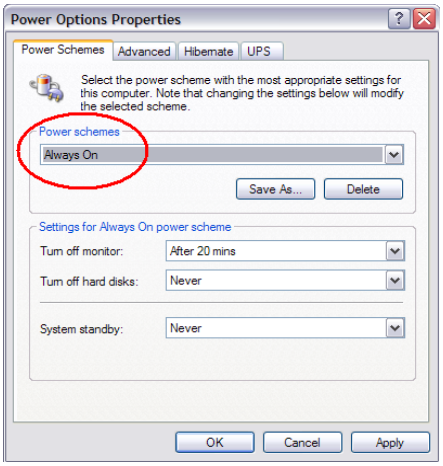
4.6.1 Platform Prerequisites

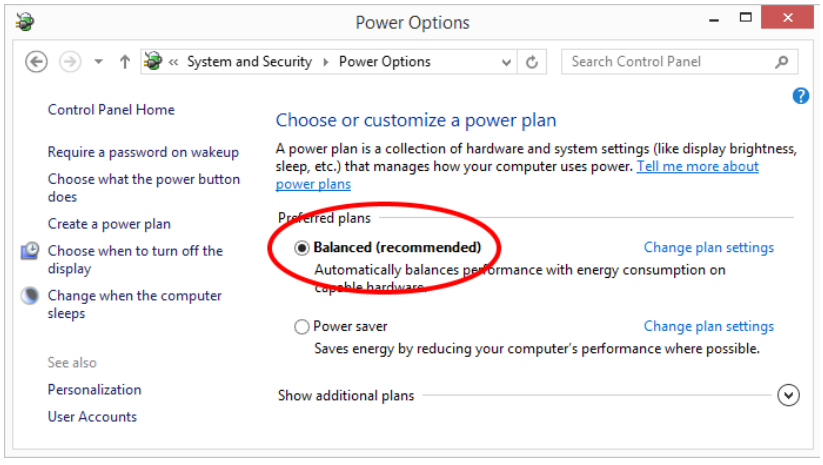
IntelliGaze™ is designed to work on recent Microsoft Windows platforms. The following operating system and software package requirements must be fulfilled.

- Windows 8, Windows 7 (SP1)
- Windows Vista (SP2) is no longer supported, IntelliGaze 3.0 is the last Windows Vista compatible version
- Windows XP is no longer supported, IntelliGaze 2.5 is the last Windows XP compatible version
- .Net Framework 4.5 (will be automatically installed by the IntelliGaze™ installer if the PC has internet connection. If the framework is not installed and the PC has no internet connection the .Net Framework 4.5 can be installed from the IntelliGaze™ installation CD)

Carefully consider that mobile computers tend to throttle the CPU in idle times and under battery power. Under these conditions, the hardware might no longer meet the above minimum requirements!
It is highly recommended to turn most power-saving functions off.

Power Options for Windows XP, Windows 7 / 8:




Power Options
System and Security
Power Options
Search Control Panel
Control Panel Home
Require a password on wakeup
Choose what the power button does
Create a power plan
Choose when to turn off the display
Change when the computer sleeps
See also
Personalization
User Accounts
Choose or customize a power plan
A power plan is a collection of hardware and system settings (like display brightness, sleep, etc.) that manages how your computer uses power.
Tell me more about power plans
Preferred plans
Balanced (recommended)
Change plan settings
Automatically balances performance with energy consumption on
Power saver
Change plan settings
Saves energy by reducing your computer's performance where possible.
Show additional plans

4.6.2 IntelliGaze™ Software Installation

The latest version of IntelliGaze™ can be downloaded here.

www.alea-technologies.de

→ Support → Login *-Please use your customer login, which will be provided on request-*
→ Download → Restricted Download

Do not connect the camera to the PC before IntelliGaze™ is installed!

You will need administrator rights to install IntelliGaze™ however the operation does not require them.

1. Launch the ***setup.exe*** from the installation package. There is just one installer for all supported languages. On the installation CD, the setup.exe is located in the IntelliGaze™ folder. If the CD-autostart is activated in your windows, installation will start automatically when the CD is inserted.

2. Accept the license agreement.

3. By default the camera driver is automatically installed.

4. After installation there is now a desktop icon and shortcuts in the program menu.

You can launch setup.exe with the "/quiet" parameter to install it without user interaction. This can be used to integrate this installer into other setup packages.

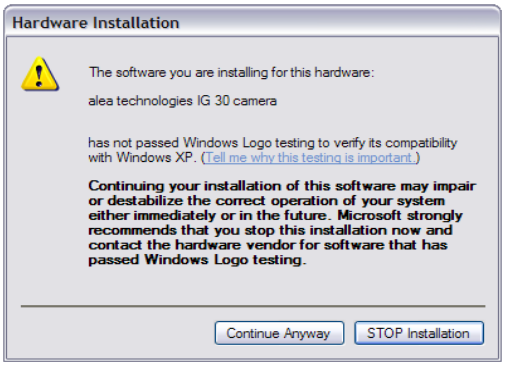
4.6.3 Camera Driver

The driver will be automatically installed with the IntelliGaze™ software. After the installation of IntelliGaze™ you may connect the camera to a USB 2.0 port of your PC.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install software for:
alea technologies IG 30 camera
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

You will now be prompted to allow the installation of the driver after the windows hardware detection has found the new camera. Whenever you change the camera connection to a port that has never been used before by the camera, you will be prompted to permit the installation again.

Confirm the security warning to finish the driver installation.


Hardware Installation
The software you are installing for this hardware:
alea technologies IG 30 camera
has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

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4.6.4 Licensing

IntelliGaze offers three different license packages. Depending on the license IntelliGaze offers different types of access.

	Starter	Communication	Full
Assisted Access	x	x	x
API Access (i..e. Grid2)		x	x
Safe Access			x
Full Access			x

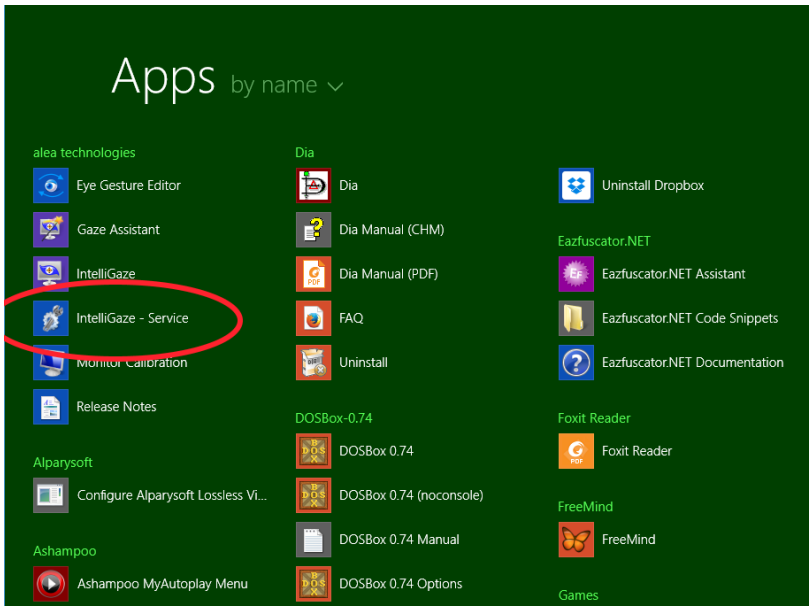
The license is handled by the camera system hardware

Please refer to the chapter ' Licensing' on page 59 for more information.

4.6.5 Service Mode Options

After the software installation you need to set some parameters to make sure that IntelliGaze operates at it's best performance on your hardware platform. Open the service mode from the program start menu. In Windows 8 you access the apps list by swiping the start menu up.

For a complete reference of the Service Mode Options refer to the chapter 'Service Mode'.



On tablet pcs you should always choose the speed “Power Saving 1”. On computers where battery life-time doesn't matter or where you need a higher tracking speed you should choose 40Hz.

The seconds page of the Service Mode allows you to enable touch screen support on Windows 7 computers. Enable touch screen support and touch the display when prompted. If the touch display driver is not detected automatically you may choose the driver manually.

Windows 8 computers don't need to enable touch support explicitly. In Windows 8 supports touch natively.

4.7 Monitor Calibration

The last step of the setup process is the calibration of the monitor-camera configuration

The monitor calibration requires a metric ruler of about 40 cm.

For further details please refer to chapter 5.4.

> *A badly calibrated monitor will result in inaccurate head-motion compensation and therefore provide inaccurate gaze position measurements.*

4.8 System Validation

This step will make sure that all components have been installed correctly and the system is working according to specification.

It assumes all setup-steps above have been completed successfully.

1. Connect all cables.
   At the back of the CAM30 system there is a LED that turns green if the illumination has power.
   The LED of the CAM30NT shows the green LED when IntelliGaze is started.
2. Turn-on the PC and boot Windows. Login.
3. Start IntelliGaze™, if not included in 'Autostart'
   You should see the following:
   - Dark red shining outer LEDs, the illumination will go to a standby mode if no head was detected for a while. In standby mode, the outer LEDs will flash only about once a second.
   - The status windows showing a green or yellow head symbol when the head is within the working range
   - Ctrl + F5 start a calibration (if the monitor is not calibrated you will get a message that the calibration can't be started)
4. If the system is calibrated you should see the cursor following your gaze.

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5 Using IntelliGaze™

5.1 Principle of operation

The IntelliGaze™ system allows the user to control specialized, e.g. AAC, applications as well as many standard Windows applications through eye-movements.

A camera and illumination system mounted underneath the monitor receives images of the users face under invisible near-infrared illumination. A background PC program analyzes the images in real-time and extracts face and eye locations. High resolution image processing algorithms calculate the gaze angle of the user. By calculating the intersection point of these gaze-vectors with the monitor, the system can determine the gaze location on the screen. Heuristics and configurable filtering are applied to synchronize the mouse-cursor with the calculated gaze location. Mouse-clicks can be triggered by either dwelling on a certain region or blinking. The user may also use external switches or buttons to trigger the click.
A new user needs to be calibrated to the system, before the gaze control can be used. The gaze tracking and 'click' control can be adopted to the user requirements and the target application.

5.2 Environment

The IG-30 and IG-30NT has been designed for indoor use. The equipment should be used in an office-like environment.

General Considerations

Provide

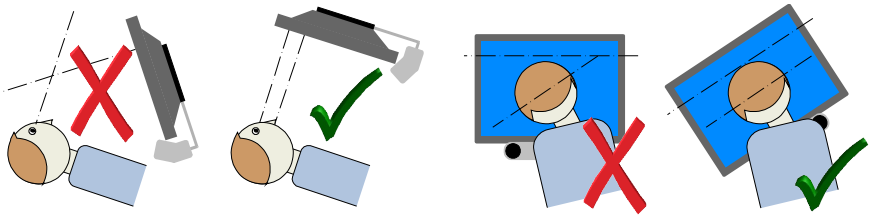
- Well lit, comfortable seating or bed-site condition.
- The subject should be comfortable and stably positioned.
- Ideally both eyes should be clearly visible from the camera position.
  If one eye is covered, please refer to the monocular options in the calibration settings.
- The monitor-camera combination should have room and sufficient degrees of freedom to achieve a good position in-front of the user. We do highly recommend the use of monitor arms.

Avoid

- Direct Sun-Light.
- Direct exposure to secondary IR sources like halogen bulbs, etc.
- Complex prescription glasses like bi-focals, etc.

WARNING - If the IntelliGaze product is mounted in such a way to a monitor that it may fall and potentially harm the user, this is done solely at the user's own risk. alea technologies or any of its representatives do not take any responsibility and will not be liable for any damages or injuries arising from the product falling onto someone or something, even if the mounting has been made according to instructions.

As a general rule, the user should be centered in-front of the screen in a normal working position, whenever possible. If the system will be mounted above a bed, or the users head has been stabilized in a slightly tilted position, please adjust the monitor accordingly as pictured below.



5.3 Special Cases

IntelliGaze™ is designed to work out of the box for the majority of users without adjusting any parameter. Some parameters allow users to adopt the system to special cases. The following overview explains which parameters should be used in which situation.

5.3.1 Glasses

Most glasses do not interfere with the system, but bifocals and multifocals can be problematic.

If calibrating a subject wearing glasses continuously gives you an inaccurate calibration, you should first try to change the camera position and repeat the calibration. Very often some disturbance reflection on the glasses will disappear if you change the system geometry. The eye video window will help you to find good positions for the camera. Ctrl + F10 toggles the head status window into an eye video if this option is activated in the IntelliGaze™ service mode.

In rare cases, the accuracy will be decreased when using IntelliGaze™ with glasses. You should increase the cell size of your communication software in this case.

Sometimes when working with glasses, a limited area of the screen cannot be calibrated and used. Try to change the calibration area (center, bottom, full) and avoid putting AAC input functions in the problematic area.

5.3.2 Monocular Operation

When just one eye of the subject is visible you should select "left or right eye calibration" and check the option "ignore the other eye completely". When just one properly moving eye is available because the other eye is a glass eye or is visually impaired, you should NOT check the option "ignore the other eye completely". Both eyes are used for tracking but only the good one is used for calibration.

In monocular operation mode the accuracy can be decreased. Make sure that the cells of your communication software are large enough to cover this inaccuracy.

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5.3.3 Calibration area

Sometimes cognitive weak or visually impaired users can't look into all corners of the monitor. When you experience a systematic calibration error in one of the corners, you should shrink or move the calibration area. The accuracy outside the calibration will be decreased. Make sure that buttons and cells are larger when you want to use that region for gaze interaction. Some users can only look vertically or horizontally. Choose the calibration area vertical or horizontal in this case. Make sure the buttons and cells of a communication package are placed vertically or horizontally.

5.3.4 Cerebral Palsy

Cerebral Palsy users often move the head very fast. Make sure that the center of movement is also the center of the working range at 60cm. It is recommended to use a one point calibration and large buttons and cells in the communication software. A simple and fast calibration with quick success reduces the stress for the user.

The 16-point-calibration is designed for highest accuracy at the expense of a possibly lowered head movement range. Do not use this calibration method when the user moves his or her head a lot.

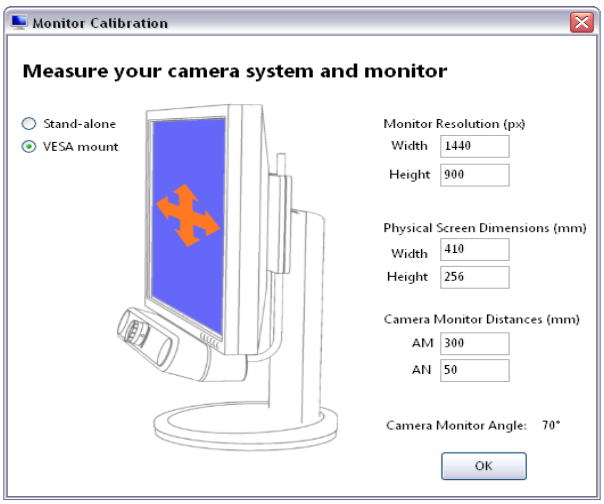
5.4 Monitor Calibration

In order to ensure the highest gaze accuracy over the large working range, the physical setup of the system needs to be calibrated when the system is being integrated.

Upon first start you have to select which camera is used.

Integrated cameras don't have to be measured. Integrated cameras are using fixed pre-configured values. The monitor tool will quit when you select the integrated camera. Neos13 is such a device with integrated camera.

CAM30 and CAM30NT must be measured with the tool. The measurements cover the physical properties of the monitor and the position of the camera unit relative to it.



A failure to measure the monitor-camera parameters correctly will cause high gaze location errors under head-motion.

1. Use the tool **Monitor Calibration** which can be launched from the start menu.
   → *Programs / alea technologies / Monitor Calibration*
2. Choose the VESA mount option if your camera unit is attached using the standard IG-30 VESA mount adapter, and choose the standalone option if your camera is mounted otherwise.
3. Finally, follow the instructions in the calibration tool and enter the following parameters:
   - The screen-resolution of the monitor.
   - The physical dimensions of the panel without the monitor frame.
   - Two or three measured distances between the camera and the monitor. Please check the monitor sketch for detailed reference..

In a dual monitor setup make sure the camera is attached to the primary monitor. The resolution of the primary monitor will be auto detected by the tool.

The monitor resolution should be kept constant during the whole operation. The system will notify the user when the entered value does not match the actual monitor resolution when a calibration is started. IntelliGaze™ will try to adopt the gaze-cursor coordinates to possibly changing resolutions during the operation of the system e.g. in games. Nevertheless, the system should be validated carefully in such cases.

You will have to repeat this measurement whenever the camera changes its position with respect to the monitor. The values are saved in a xml settings file which is located in the folder:

\\Current User\Local Settings\Application Data\alea_technologies_gmbh\IntelliGaze\planes.settings

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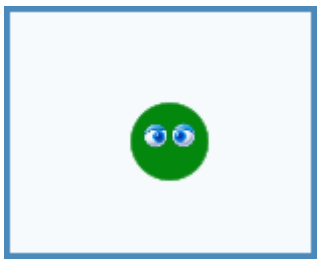
5.5 Tracking Status Indicator

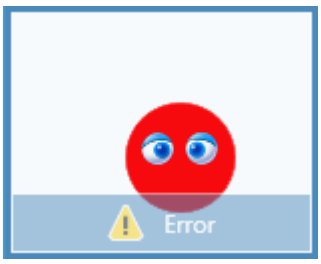
The Tracking Status Indicator supports the proper positioning of the system and subject and provides feedback about the eye-tracking status during operation of the system. It displays the 3D location of the head in the tracking volume (position & size) as well as the status of the head-tracking operation (green, yellow, red).

The status of the eye-tracking is displayed independently for each eye.

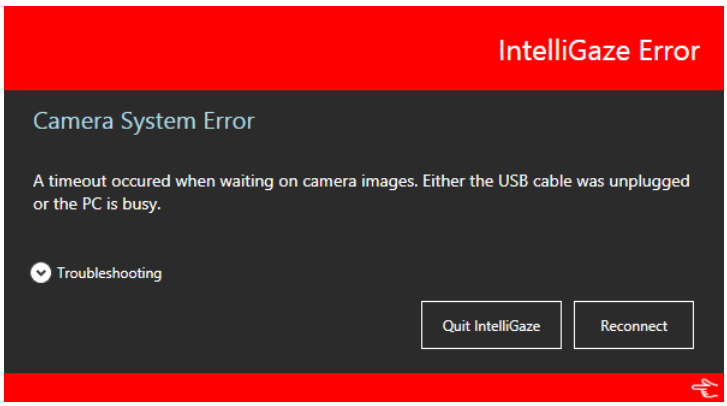


The Tracking Status Indicator is always be shown at the top of the monitor. It will pop-up the display when problems occur and hide it again when the tracking continues successfully. For a continuous visualization of the Tracking Status Indicator the operator should open the Operation Center.

Some non-critical and critical error conditions are shown at the bottom of the Tracking Status Indicator:



Clicking on the error or warning button will open an info dialog providing more details about the error or warning.


IntelliGaze Error
Camera System Error
A timeout occured when waiting on camera images. Either the USB cable was unplugged or the PC is busy.
Troubleshooting
Quit IntelliGaze
Reconnect

The *Troubleshooting* Button will open an online help if the pc is connected to the internet.

Errors will cause the eyetracker stop working while Warning will very often just degrade the performance of the eyettracking.

5.5.1 Hardware Error Codes (CAM30NT only)

CAM30NT has an advanced system health monitor. The error codes indicate non-critical or critical errors that require attention.

Hardware Error Code	Description	Action
1	Temperature too high	Power off device, make sure it's not exposed to direct sun or a heating, restart device after it cooled down
2 (USB cable too long)	The USB cable is too long to provide enough power to the device	Use a shorter USB cable or use the auxiliary USB connector to provide more power to the device
3	LED Voltage too low	PC doesn't provide enough power over the USB, try using the auxiliary USB connector
4	LED open	IR LEDs are broken, contact alea support
5	I2C error	Internal electronics failure, contact alea support

It is acceptable if the performance indicators pop-up from time to time especially if you launch other applications or if you run applications that consume a lot of processing power. If the T indicator is constantly on, you should verify the system configuration.

In energy saving mode, laptops usually power down the CPU which causes performance indicators to pop up.

5.6 Operation Modes

IntelliGaze can be operated in three different modes. The modes determine the complexity of the tasks which can be performed with IntelliGaze. Additionally IntelliGaze adopts so that power users benefit from the availability of advanced options and a versatile user interface while inexperienced users and caretakers enjoy a simplified user interface and limited functionality.

The possible operation modes are determined by the license. A license can be upgraded to switch an "Assisted Access" system into a "Save Access" or "Full Access"

In energy saving mode, laptops usually power down the CPU which causes performance indicators to pop up.

5.6.1 Assisted Access

The assisted access is designed to work optimal in an environment where a users needs permanent assistance by a caretaker or teacher. Typical applications used in the context of the assisted access mode are "Look To Learn" or "Life Tools" or other learning software.

The IntelliGaze user interface is stripped down to the minimum set of functions to adjust user position, calibrate a user and chance basic parameters like cursor shape. When IntelliGaze is launched in Assisted Access gaze interaction is disabled until the caretaker un-pauses the device to give the caretaker time to start the learning software. A default calibration can be loaded with a single click to allow users gaze interaction even if they are not able to calibrate.

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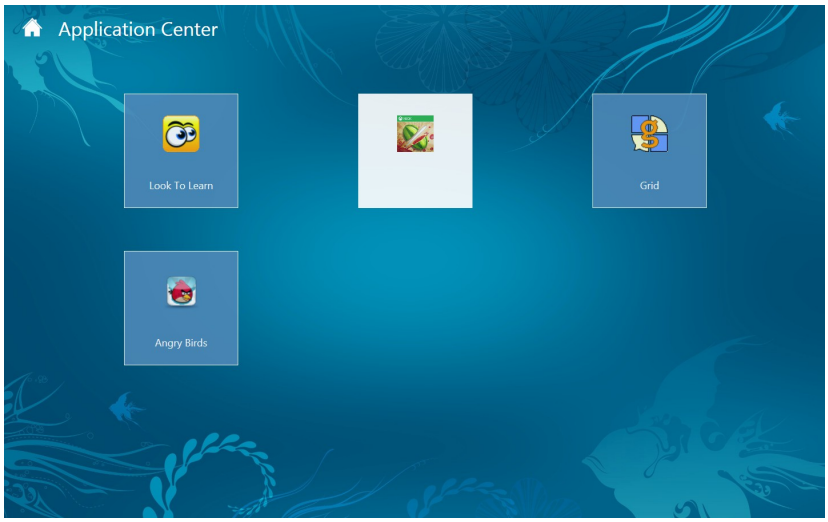
The Operation Center in Assisted Access offers just an option for calibration, close application, pause and basic cursor options. All functions can be accessed with keyboard shortcuts. Escape will return to the previous dialog or quit the operation center.

5.6.2 Safe Access

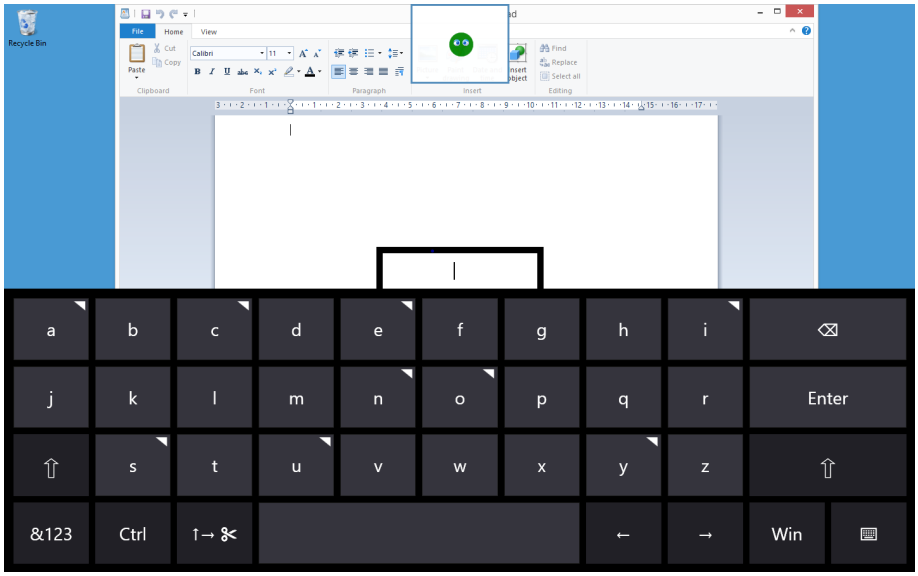
The Safe Access allows caretakers to customize an environment where the users can autonomously switch between different applications without the need of Windows desktop access. The Safe Access offers more options to the user and the caretaker. The Windows desktop will be replaced with a configurable Home-Page (Application Center - AC). Applications which are launched from the Application Center may use off-screen accessible areas which control the mouse or touch behavior to interact with applications. The AC can be filled with standard desktop applications or Windows Store applications. In an application is terminated IntelliGaze will return to the AC.



The operation center options offer access to more parameters than the Assisted Access operation center options. The user or caretaker can close an application, open a task manager, calibrate, call help, pause the system or access a wide variety number of options to configure profiles, cursor shape and behavior, volume and many more.

5.6.3 Full Access

The Full Access offers the most flexibility for user which want to use any desktop application. The user interface offers control panels to interact with Windows 8 apps as well as standard desktop applications such as Word, Firefox, Skype, Adobe Reader and many games. Applications are launched directly from the Windows start menu or desktop. IntelliGaze profiles will automatically adopt eye tracker parameters to the active application.



The operation center offers the same versatile options as the operation center in the safe mode.

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5.7 General Use --> see Quickstart Guide

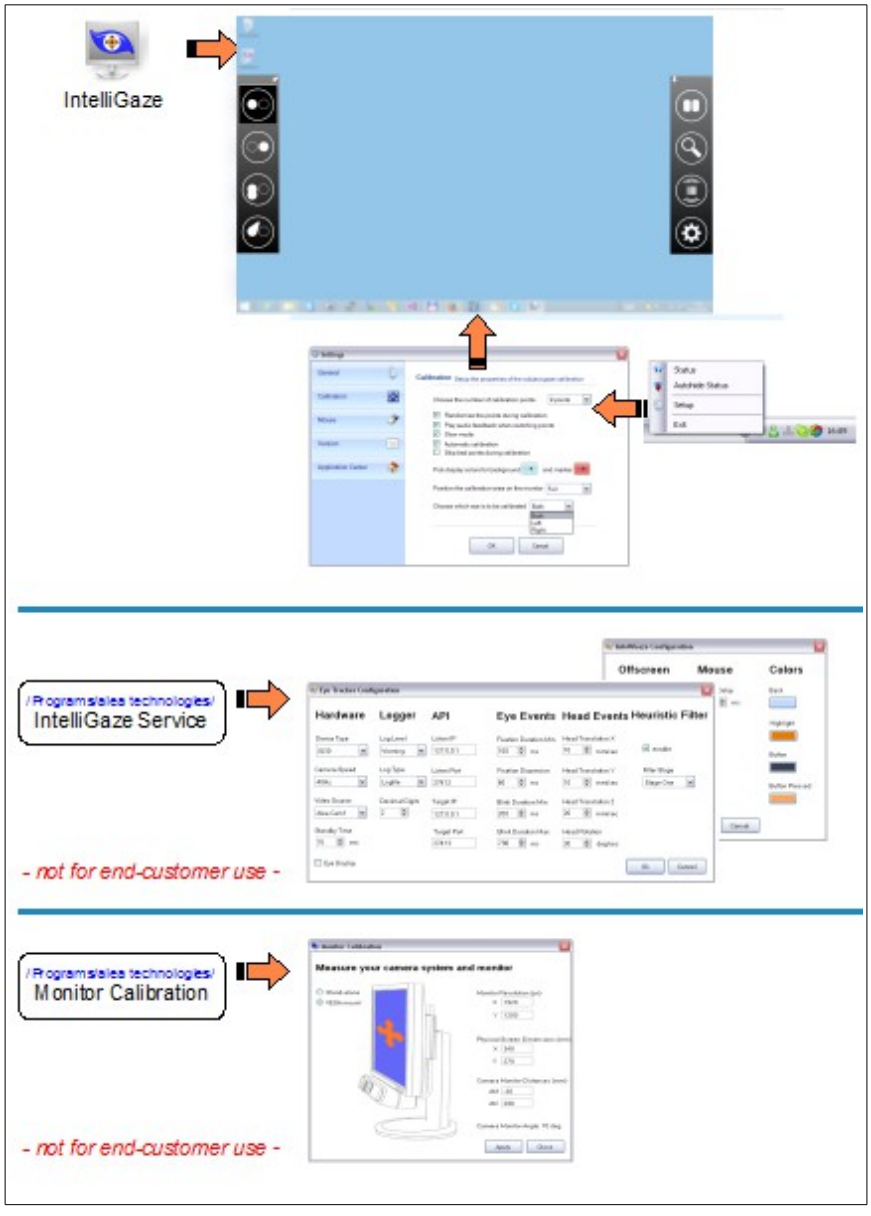
PDF version of the Quickstart Guide is included in the setup CD and it is installed with IntelliGaze.

6 IntelliGaze™ Reference

6.1 Overview

The IntelliGaze™ software package consists of several modules:

1) IntelliGaze™ Main Application .
2) IntelliGaze™ Service Mode Modification of in-depth parameters.
3) Monitor Calibration Tool to calibrate the physical setup.
4) Gaze Assistant Application to evaluate user and system performance.



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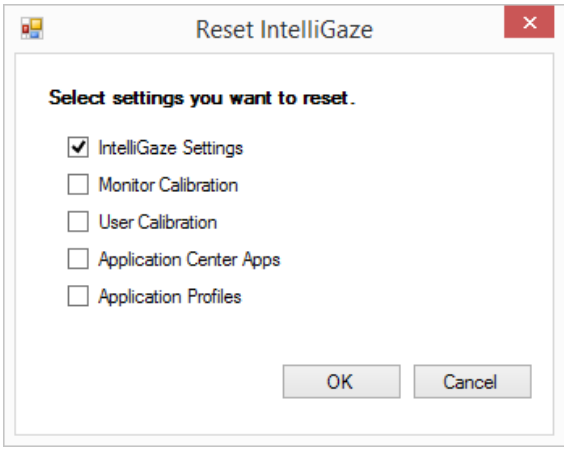
All IntelliGaze settings can be reset to installation state using the tool `Reset-IntelliGaze.exe` which is located in the installation folder of IntelliGaze.



6.2 System Hotkeys

The hotkey assignment can be redefined (see: Service-Mode), therefore only the standard set can be listed.

Hotkey (default)	Function	Comment
Ctrl- F5	Start Calibration	ESC will cancel
SPACE	Accept point during calibration	will trigger the overwrite mode during a binocular calibration
PAUSE	Dis-/Enable Cursor Control	Toggles Gaze<>Mouse
Ctrl- S	Toggle Standard Mouse-Cursor on/off	
Ctrl- F1	Show Operation Center	
Ctrl- F11	Enter Preferences	
Ctrl- D	Starts desktop screen video recording	The status monitor shows a record icon in the upper right corner Video is encrypted. File location: /My Documents/alea_technologies_gmbh/IntelliGaze
Ctrl- L	Load calibration profiles	
Ctrl- K	Save calibration profiles	
Ctrl- H	Show help for keyboard shortcuts	

Service and Administration Hotkeys (not for client use)

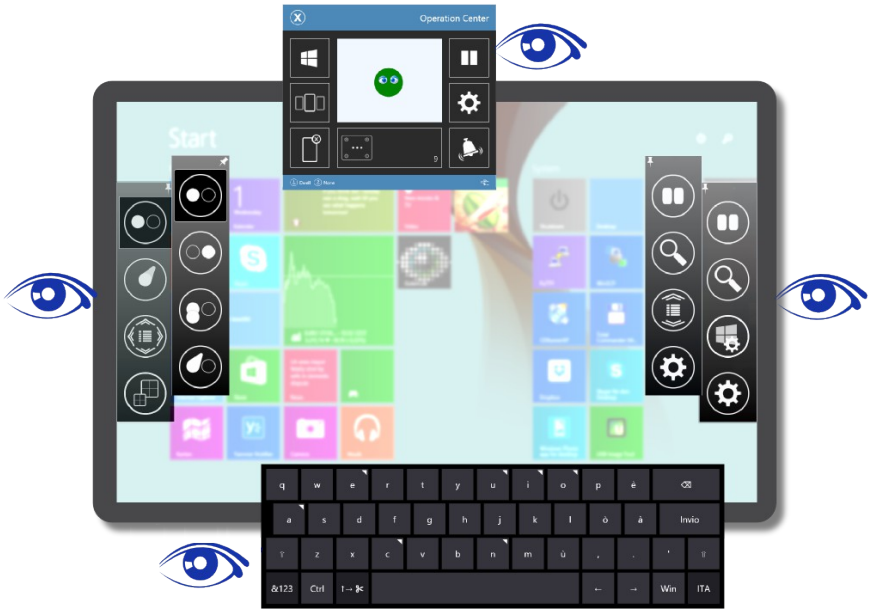
Hotkey	Function	Comment
Ctrl- I	Snap Image to file	no feedback. Image is encrypted. File location: /My Documents/alea_technologies_gmbh/IntelliGaze/
Ctrl- R	Record Video	The status monitor shows a record icon in the upper right corner. Video is encrypted. File location: /My Documents/alea_technologies_gmbh/IntelliGaze/
Ctrl-F10	Show eye image in status monitor	Visual feedback for reflections on glasses. Needs to be enabled in Service-Mode.

The mapping schema can be changed to a different mapping in the IntelliGaze Service-Mode.

You can open a list with all available shortcuts from the IntelliGaze tray icon menu or press Ctrl+H

6.3 Desktop Control

With a full IntelliGaze license the user can efficiently control the Windows desktop, applications or Window Store Apps. IntelliGaze will automatically detect the environment and will switch the user interface to an appropriate style. Additionally IntelliGaze application profiles will make sure that the gaze interaction will automatically adopt to the need of the active application.



Gaze Interaction UI - Sidemenus for Desktop and Windows Store Apps

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6.3.1 Side Menus

Special functions, mouse functions and touch input functions can be activated from side menus. Side menus are activated with an off-screen fixation and can be made 'sticky' with another off-screen fixation if the menu is visible. Non-sticky side menus will disappear after a few seconds of idle time. The status of the menu is visualized by a small needle icon at the top of the menu bars.

Desktop – *Left Side*

Single Left Click

Single Right Click, lockable*

Double Left Click, lockable*

Drag and Drop

*/ Locked Mouse actions will be used with every click until they are unlocked again. By default, Single Left-Click will be enabled after every other click action.

Drag and Drop Options

Three different drag and drop options are available to allow the user either fast and coarse or very precise drag&drop or selection operations.

1. 2. →

1. Direct, single click select and drop operation.
2. The Position Helper will be used for very precise select and drop operation.

The Position Helper tool does not place the mouse cursor directly at the gaze location, instead the position of the Windows cursor is moved according to the gaze position relative to a 'dead zone' (red circle).
A fixation inside the dead zone initiates the mouse click.
After the primary selection, the dead-zone shape changes to an octagon and the secondary selection can be completed as before.

All menu functions are disabled while a drag&drop operation is in progress.

Desktop – *Right Side*

Pause
halts the gaze interaction, can be restarted with a second activation on the pause button.

Enforce Magnifier
will pop up the magnifier at the next activation on the screen.

Scroll
will open a scroll selection pop-up to choose between text scrolling and selection scrolling.

Configuration
allows to configure options

When paused, the menu will disappear after 30s to allow undisturbed media-consumption or similar. Another off-screen fixation will bring the menu back.

Scroll Selection

Two different scroll modes are available to choose between text scrolling operation and selection scrolling operation.

1 2 →

1. Selection scrolling
Used to select an item from a scrolling list of options. Exit with a fixation inside the scroll area.

2. Text reading scrolling
Used for reading long texts with automatic scrolling and minimal obstruction. Exit with fixation on upper right exit icon.

WindowStore Apps – *Left Side*

The off-screen App Gestures menu can be accessed on the left side of the screen.

Tap and Select Gestures

Drag and Drop Gestures

Pan and Scroll Gestures

Zoom and Rotate Gestures

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Tap and Select Gestures Options

Four different Tap and Select Options are available.

1. 2. 3. 4. →

1. Single tap
2. Double tap
3. Right mouse click
4. Select tap

Drag and Drop Gestures Options

Two different drag and drop options are available to allow the user either fast and coarse or very precise drag&drop selection operations.

1. 2. → 1. Hold "finger" down and move it with the eyes
2. The Position Helper will be used for very precise select and drop operation.

Pan and Scroll Gestures Options

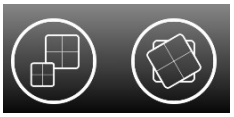
Two different Pan and Scroll Gestures are available to allow the user either use a reading scroll mode or a mode where you can pan in any direction.

1. 2. →

1. Pan in any direction
2. Reading scrolling

Zoom and Rotate Gestures Options

Zoom and Rotate are multi-touch gestures.



1. 2. →

1. Switch to the zoom mode
2. Switch to the rotate mode

WindowStore Apps – *Right Side*

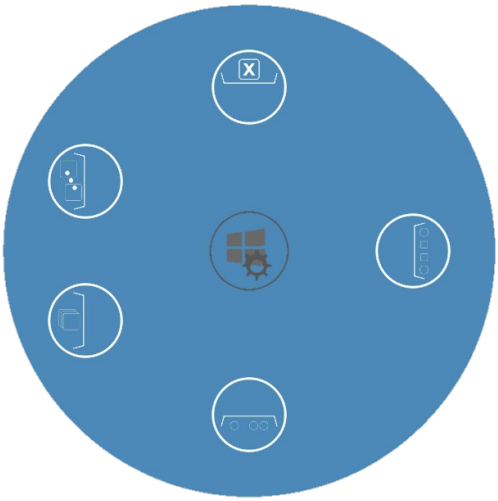
Pause
halts the gaze interaction, can be restarted with a second activation on the pause button.

Enforce Magnifier
will pop up the magnifier at the next activation on the screen.

System Gestures
will open a system gesture menu that allows the user to perform a windows system gesture just like close, charms or switch app

Configuration
allows to configure options

Windows System Gestures
System Gestures are special Windows operations to switch between apps, close an app, show the charms menu or application options.



Close
Close the app

Charms Menu
will open the Windows charms menu

Application Options
opens the options menu of the application

Task Manager
shows the windows task manager to switch between apps

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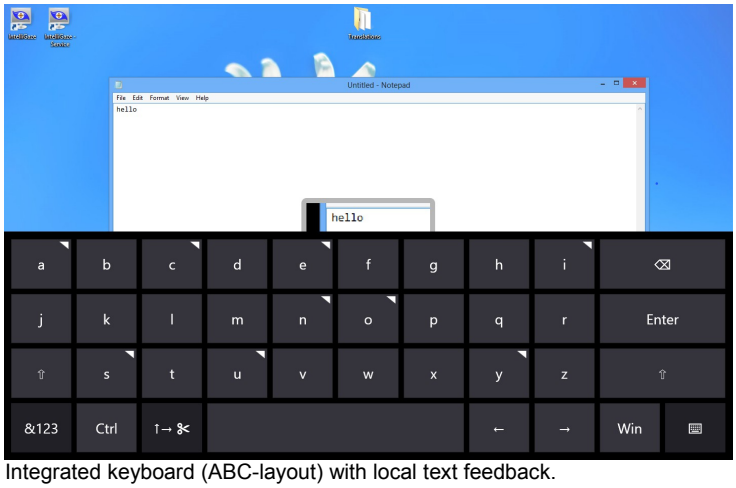
Activate next app
switches to the next app in the list

6.3.2 Integrated Keyboard

A click inside an edit box or a text field will automatically pop up a keyboard. Depending on the pre-selection of the setup menu, one out of three keyboards will be activated.
Use either the integrated alea keyboard for easy typing, the Windows OSK which supports several languages and provides word prediction or an optional third party keyboard which can be customized.



Integrated keyboard (ABC-layout) with local text feedback.

Shown above is the integrated alea keyboard. Buttons that are marked with a tiny triangle in the corner offer international variations of the letter when performing an immediate second fixation on the same button.

The preview on top of the keyboard shows the content of the cursor even if the text field is hidden by the on screen keyboard. Its purpose is to provide quick feed-back.

There are several layouts available. The layouts can be switched during run time if they are activated in the 'IntelliGaze Preferences '. At least one layout must be selected.

Example layouts for the integrated keyboard.

Italian

Hebrew

6.3.3 Magnifier

A click in a region with small, crowded elements will automatically open the magnifier to allow for precise selections.

Interactive Magnifier

The magnifier will always be opened in the middle of the screen. It provides a live view of the desktop, rather then a simple, static snapshot and it can be shifted around by looking at or beyond the little arrows outside the central area.
The operation can be canceled by looking at the top-right cross.
The automation will always try to snap the cursor into elements. When there are overlapping elements and controls it can be advantageous to turn the automation off to prevent false selections. This can be done with the lower left button.

As constantly finding interactive GUI elements is a performance demanding task, slower PCs might fail to accomplish the calculations in real-time. The magnifier will then always pop up when the search for elements does not finish in time. A red frame on the magnifier indicates that the magnifier popped up because of lack of processing power on the PC.

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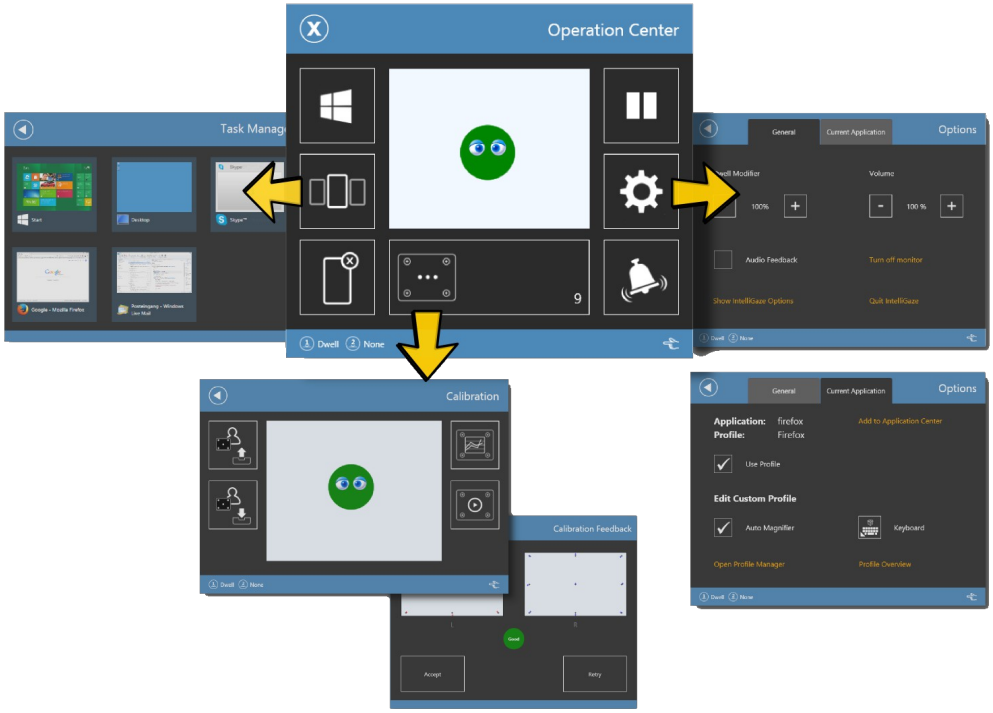
6.4 Operation Center

The operation center is the central location where the user and the caretaker control the eye tracking options. The camera/monitor orientation is done with the status window of the first page being open. In cases, where tracking is hard to stabilize or environmental conditions are very challenging, the 'eye display' mode can be enabled by clicking in the status window. After the camera is alined the gaze is being calibrated. Calibration profiles can be loaded and saved on the calibration options page.

The operation center can be opened in three different ways. Touch the display, look above the screen, use the right side menu to directly enter the application options sub-page of the operation center.

The operation center offers just a subset of options in the Assisted Access.

When opening the operation center with touch no gaze input is available in the operation center



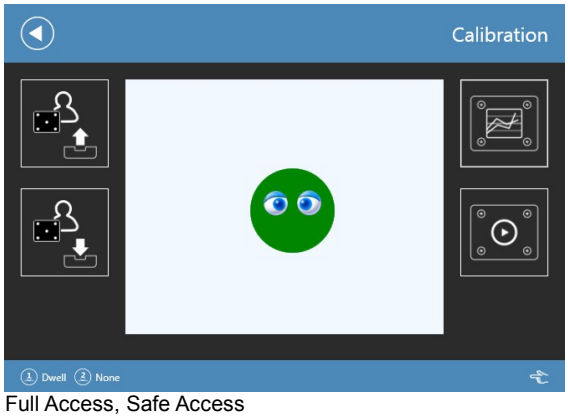
Operation Center Structure

Button	Function	Comment
	open windows start menu	Will exit the operation center, only available in full access mode
	return to the application center	Will exit the operation center, only available in safe access mode
	open task manager	allows the user to quickly switch between active applications
	close active application	closes the application in the foreground
	pause gaze interaction	
	open options	dwell time, profile options, sleep function, auditory feedback
	call help *	will activate a sound to call for assistance
	open calibration menu	

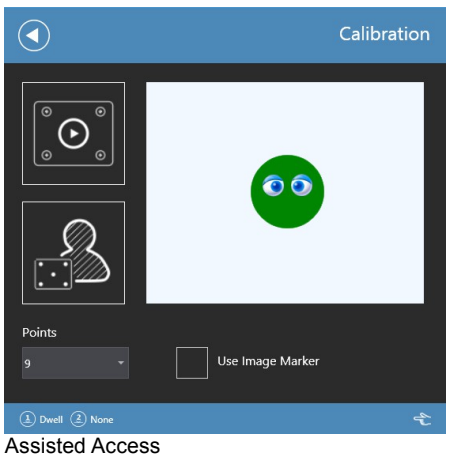
The call help can be very loud if the preference "maximize volume" is selected!

6.4.1 Calibration

The calibration page of the assisted access offers some calibration preferences which be changed directly from the operation center.



Full Access, Safe Access



Assisted Access

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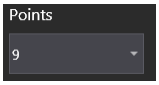
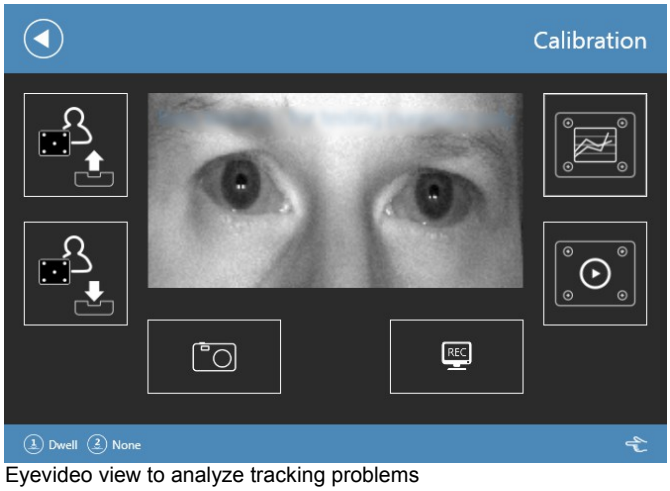
Button	Function	Comment
	Start calibration	
	Load default calibration	If a user can't be calibrated you can load a default calibration which provides decent accuracy for most of the users
	Load calibration	
	Save calibration	
	Show last calibration result	
	Show an image as calibration target	Can be an animated gif to attract users attention
	Define the number of calibration points	

Clicking in status windows will toggle the view to a live video of the eyes. This video is especially useful to analyze problematic situations when working with glasses, contact lenses or other eye tracking relevant issues.



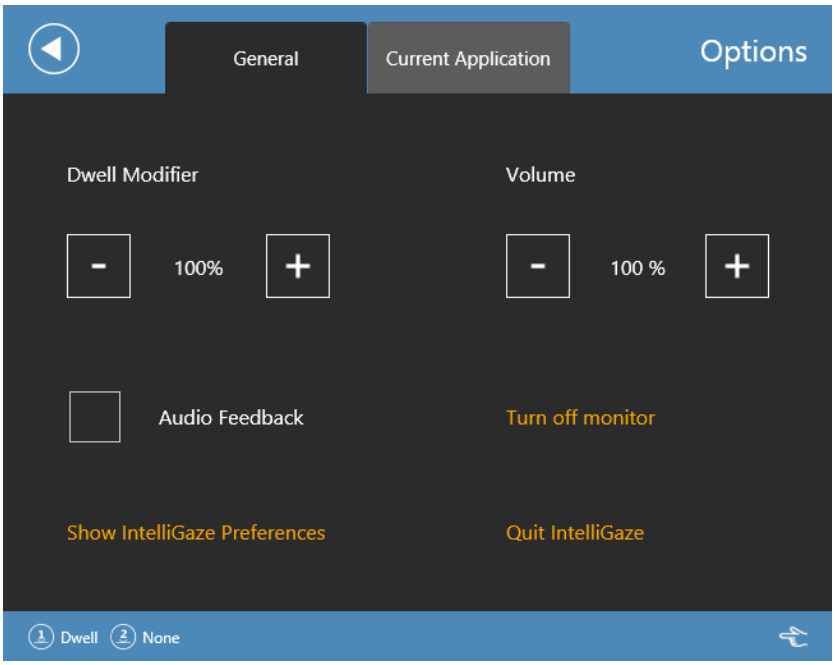
Eyevideo view to analyze tracking problems

You may want the make snapshots or a create 10-20secs video of the eyes and send the result to alea technologies to get assistance to understand possible problems and receive solutions.

6.4.2 Options

On this page users or caretakers may access options which are relevant at runtime.

General



Button	Function	Comment
Dwell Modifier	changes the speed of the dwell	the basic speed is an application profile property, the modifier is a temporal personal preference of the user
Volume	adopt the system volume	
Audio Feedback	Enable the generation of click noises	
Turn off monitor	darkens the monitor when the user wants to rest	The monitor is made bright by looking into the camera for a while
Show IntelliGaze Preferences	opens the 'IntelliGaze Preferences'	will turn off gaze interaction. The preferences are for the caretaker.
Quit IntelliGaze	quits IntelliGaze	will stop all gaze interaction

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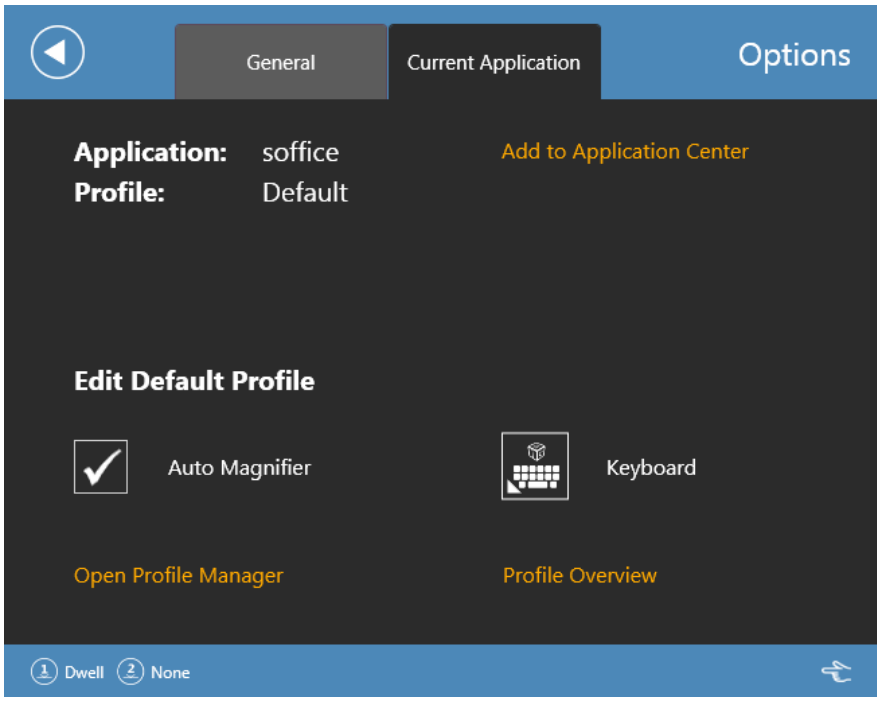
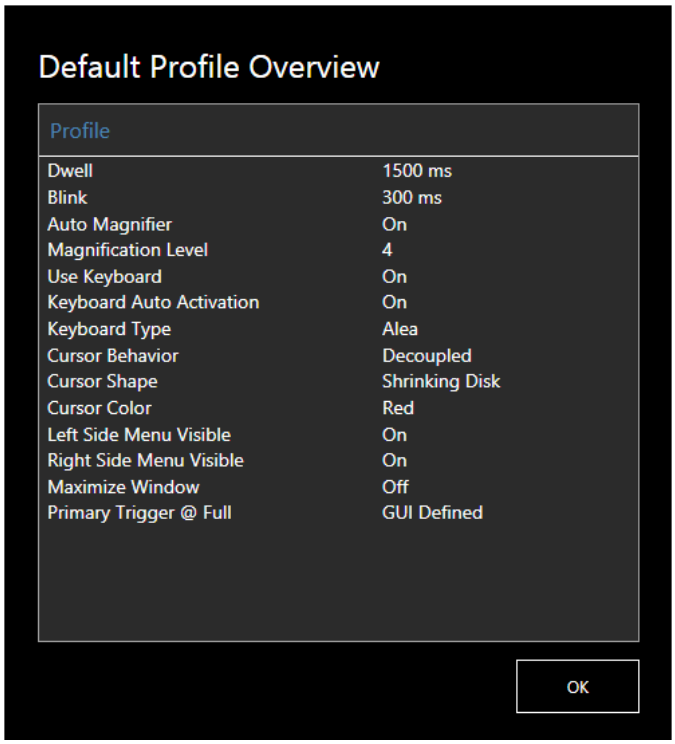
Current Application



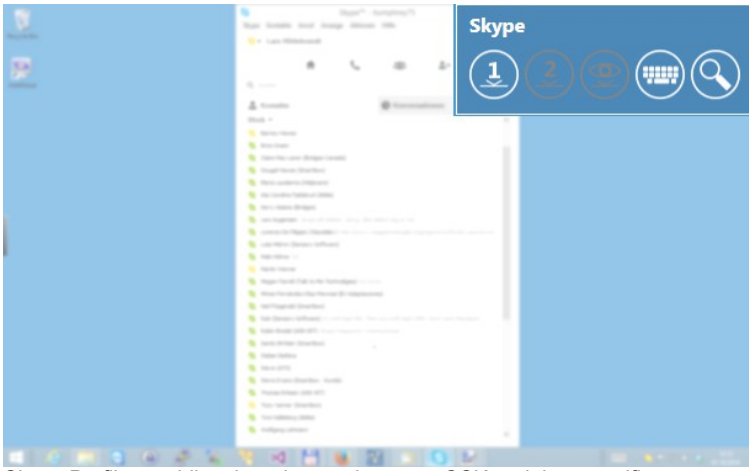
Button	Function	Comment
Application:	displays the name of the currently active application	This unique name is used to automatically find a profile for the application
Profile:	displays which profile is currently used for the application in the foreground	If no specialized profile is found the default profile is used
Add to Application Center	adds the current active application to the application center with single click	The application center is available in Safe Access only
	determines if the magnifier is opened automatically for this application	
	chooses a keyboard for the current application	The default keyboard is the alea keyboard with the preferences choosen in the Ctrl+F11 dialog
Open Profile Manager	edit the profiles or create new profiles	
Profile Overview	show an overview of the active profile	

Profile Overview

This dialog gives you a complete overview of all customizable gaze interaction parameters of the current profile.



A quick reminder for the most important profile options pops up evertime you switch an application in the upper right corner.



Skype Profile providing the primary trigger, an OSK and the magnifier

Profile Manager

The profile manager lists all available profiles. Each profile except the default profile can be enabled individually. You may add a new profile or edit an existing one.

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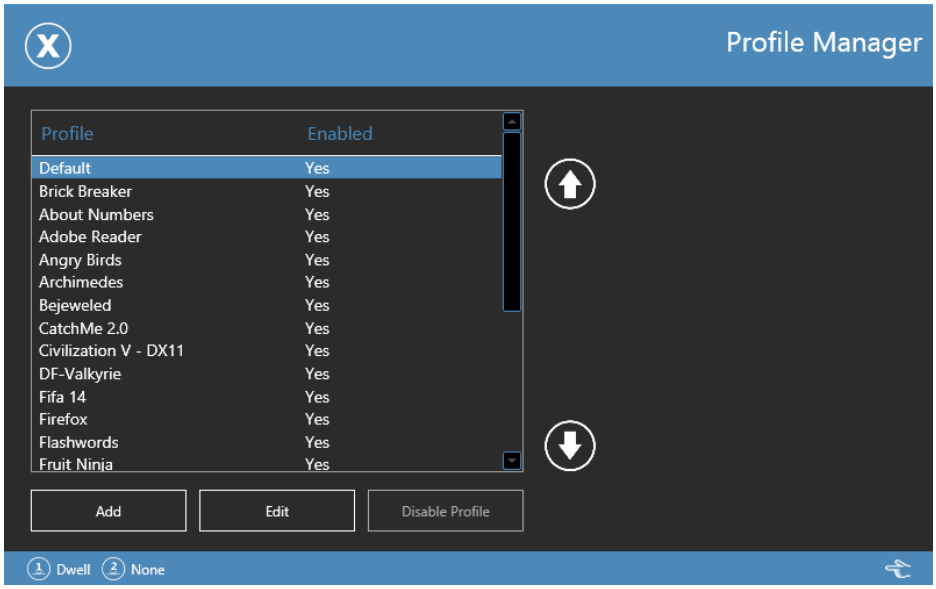
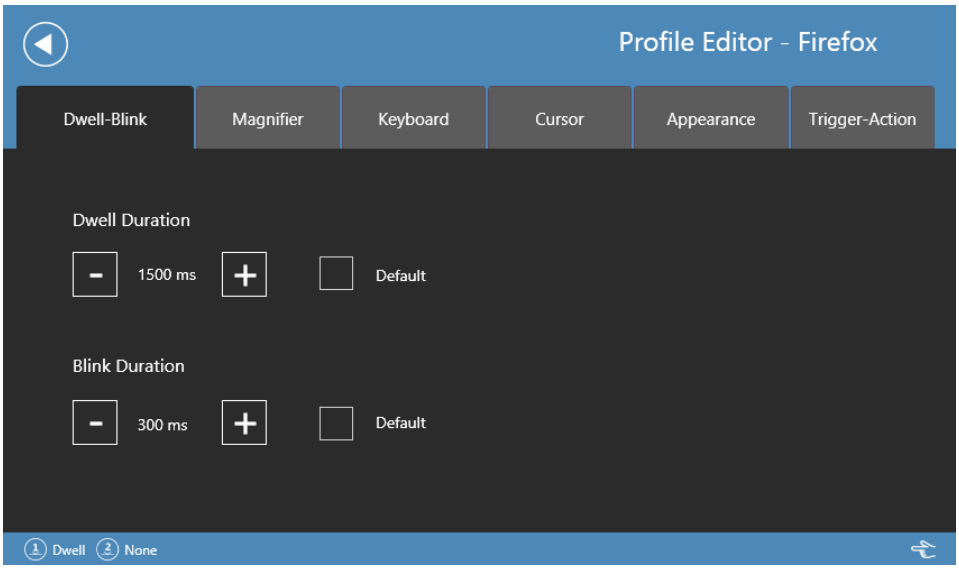


Profile Editor

IntelliGaze is installed with a wide selection of application profiles. In case you are going to deploy an application which benefits from an individual profile you can customize a newly created profile here. You may also adopt existing profiles to personalize the behavior and look & feel of the gaze interaction.

You may share newly created profiles with alea technologies. Future releases of IntelliGaze will deploy new profiles to further enhance the user experience when working with arbitrary applications.



The profile options are grouped in six categories.

Each parameter can be configured or set to default. If set to default. The setting of the default profile will be used instead. It's recommended to leave most parameters on default unless an application benefits from an individual parameter.

If you change a parameter in the default profile all profiles using default parameters will use the changed parameter as well.

Category	Parameter	Comment
Dwell-Blink	Dwell Duration	set the dwell time which is used in this profile
	Blink Duration	set the blink duration which is used in this profile
Cursor	Cursor Shape	determines the shape of the gaze cursor
	Cursor Color	chooses the color of the gaze cursor, the color should have a high contrast to the application in which it is used
	Cursor Behavior	**Fast**, used for gaming where the cursor needs to be moved in real time **Simple Mouse**, the cursor movement is smoothed **Smart – Desktop 2**, the cursor position can be displaced. It is not shown at the often inaccurate gaze position. The cursor will snap in to GUI elements using the Blickfang technology. Additionally an automatic magnifier and automatic keyboard is used
	Snap-In Distance	determines the maximum size of GUI elements in which the "Smart -Desktop2" will snap in
Keyboard	Use Keyboard	enabled or disables the usage of an integrated OSK
	Keyboard Auto Activation	if enabled the keyboard will pop up automatically when you look at editable elements on the screen
	Keyboard Type	chooses the OSK which
Magnifier	Auto Magnifier	if enabled the magnifier will pop up automatically when you look in between several small GUI elements.
	Magnification Level	chooses a magnification level
Appearance	Left Side Menu	choose if the left side menu is available
	Right Side Menu	choose if the right side menu is available
	Maximize App Window	tries to maximize the window of the application
	Status Window	determines the behavior of the status window
Trigger-Actions	list of all Trigger Actions which are available in this application	see explanation below

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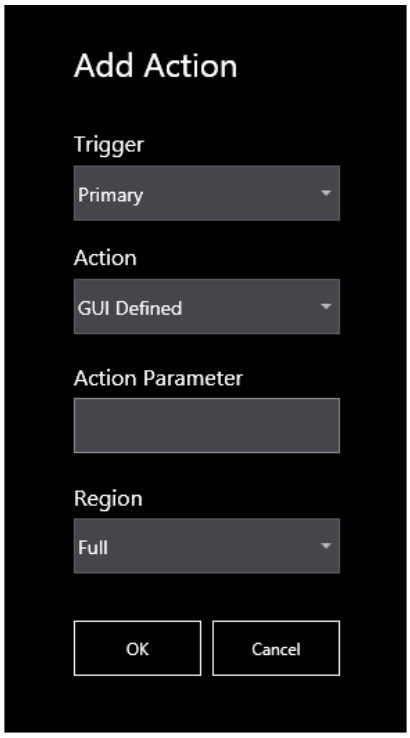
Trigger-Actions

A few applications react when you hover just the mouse cursor on elements. Most applications react on mouse clicks, touch or keyboard inputs. In the trigger actions associate a trigger with an action. A trigger in IntelliGaze is either the Dwell, Blink, Switch or Key entity.

An application can use several trigger actions. In example a movieplayer can be configured to play forward, backward, change volume with 4 different trigger actions such as blinks in for corners of the screen.



Parameter	Function	Comment
Trigger	chooses which type of trigger is used to raise the action	The trigger itself is chosen in the 'IntelliGaze Preferences' *Gaze Over* will fire the trigger as soon as the user looks into the specified region.
Action	determines which action is to be raised when the trigger fires	GUI Defined is only available for the Primary Trigger and means that the action is determined by the left side menu
Action Parameter	set the parameter for an action	You may send an entire text by choosing the Send Key action
Region	chooses a region on the screen in which the trigger is active	restricts the trigger to a certain region (or entire screen)

Send Key Parameter

Each key is represented by one or more characters. To specify a single keyboard character, use the character itself. For example, to represent the letter A, pass in the string "A" to the method. To represent more than one character, append each additional character to the one preceding it. To represent the letters A, B, and C, specify the parameter as "ABC".

Key	Code
BACKSPACE	{BACKSPACE}, {BS}, or {BKSP}
BREAK	{BREAK}
CAPS LOCK	{CAPSLOCK}
DEL or DELETE	{DELETE} or {DEL}
DOWN ARROW	{DOWN}
END	{END}
ENTER	{ENTER}or ~
ESC	{ESC}
HELP	{HELP}
HOME	{HOME}
INS or INSERT	{INSERT} or {INS}
LEFT ARROW	{LEFT}
NUM LOCK	{NUMLOCK}
PAGE DOWN	{PGDN}
PAGE UP	{PGUP}
RIGHT ARROW	{RIGHT}
SCROLL LOCK	{SCROLLLOCK}
TAB	{TAB}
UP ARROW	{UP}
F1 - F16	{F1} - {F16}
Keypad add	{ADD}
Keypad subtract	{SUBTRACT}
Keypad multiply	{MULTIPLY}
Keypad divide	{DIVIDE}

To specify keys combined with any combination of the SHIFT, CTRL, and ALT keys, precede the key code with one or more of the following codes.

Key	Code
SHIFT	+
CTRL	^
ALT	%

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To specify that any combination of SHIFT, CTRL, and ALT should be held down while several other keys are pressed, enclose the code for those keys in parentheses. For example, to specify to hold down SHIFT while E and C are pressed, use "+(EC)". To specify to hold down SHIFT while E is pressed, followed by C without SHIFT, use "+EC".

6.5 IntelliGaze Preferences

The preferences menu can be used with a keyboard, a mouse or with touch. It can be accessed via the IntelliGaze tray icon or by pressing Ctrl-F11. Alternatively it can be accessed from the operation center.

The gaze control will be turned off while editing menu entries.

- General - General Options, Version and License Status
- Calibration - Calibration parameters
- Input - Trigger to do clicks and other actions
- Integrated Keyboard - alea integrated keyboard
- Operation Center - Appearance of the operation center
- Application Center - Options for the AC 'home-page'

6.5.1 General Options

Language

The user interface language of IntelliGaze can be adapted by choosing an entry from the list.

A restart of IntelliGaze will finalize the change.

Licensing

The IntelliGaze licensing scheme is handled by the CAM30/CAM30NT camera module's hardware. The license key is stored in the camera module. This allows the user to install and run the software on several computers. Wherever the camera will be connected, the licensed functionality will be available.

The IntelliGaze™ software will only start properly if the camera has been connected.

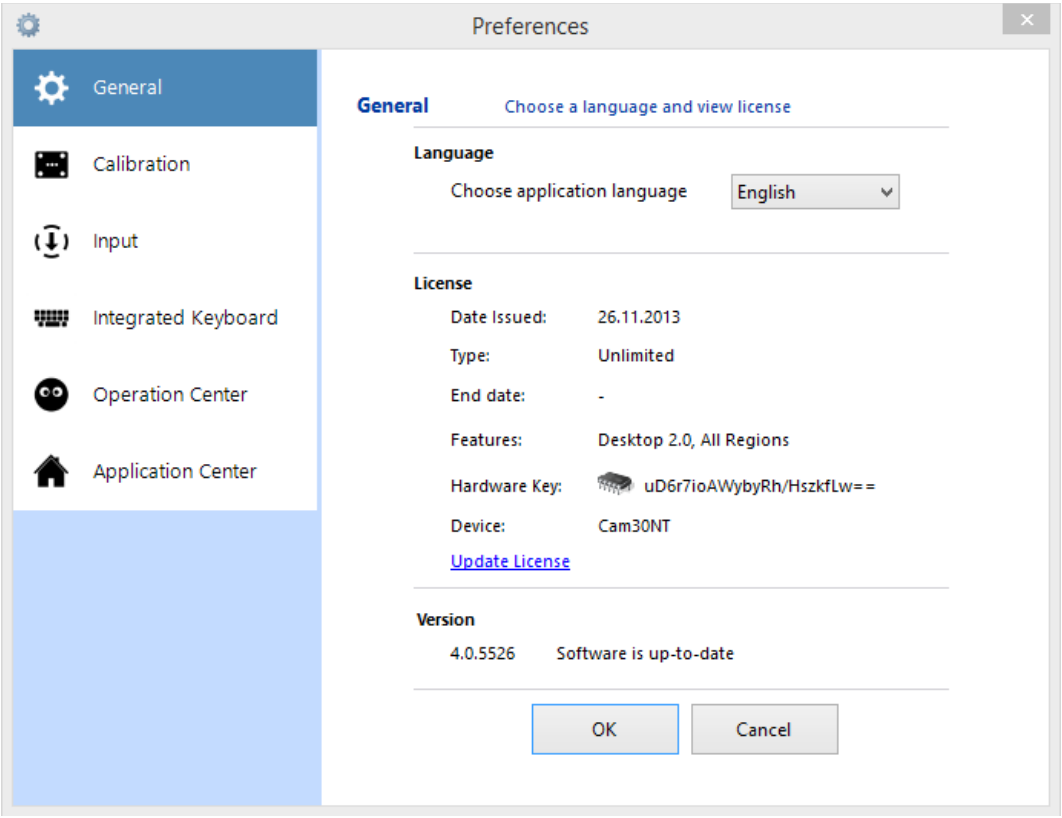
The actual licensing is done during the production process according to the customer order. Typically this will be a non time-limited 'AAC Standard' license.

The license might also restrict the use to particular client software or only grant access to particular features.

The status of the system license can be checked under: → Options → General

Feature	Description
Full	Allows desktop control using the Desktop 2 automation
Api only	Only communication packages such as Grid2 or Mind Express can be used. Assisted operation center is available as well.
Starter	Assisted operation center is available only
Professional	Device is licensed for professional applications that access raw data just like head speed, binocular gaze and eyeball position
Region A	Device supports only North American languages (English, French, Spanish)

If you are running the system on a temporal license, a warning will be issued, a few days before it will terminate.



The license can be programmed on-site without extra tools:

- The Hardware Key will have to be transferred to alea technologies.
- alea technologies will issue a new license key and re-transfer it.
- This license key needs to be programmed into the device, an option that will be offered by IntelliGaze™, when the camera is connected and no license is found. Alternatively the current license can be overwritten with the *Update License* command link on this page
- The 'Device' parameter informs the user about which device is licensed. i.e. on a Neos13 computer with integrated camera the label will show CAM30NEOS

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Software Version & Online Update

This entry shows the currently installed software version and can optionally provide information about available online updates.

Please refer to chapter 8 'IntelliGaze Software Update' for details.

6.5.2 Calibration

During the calibration, the IntelliGaze™ system calibrates the internal calculations to the individual parameters of a subject's eye.

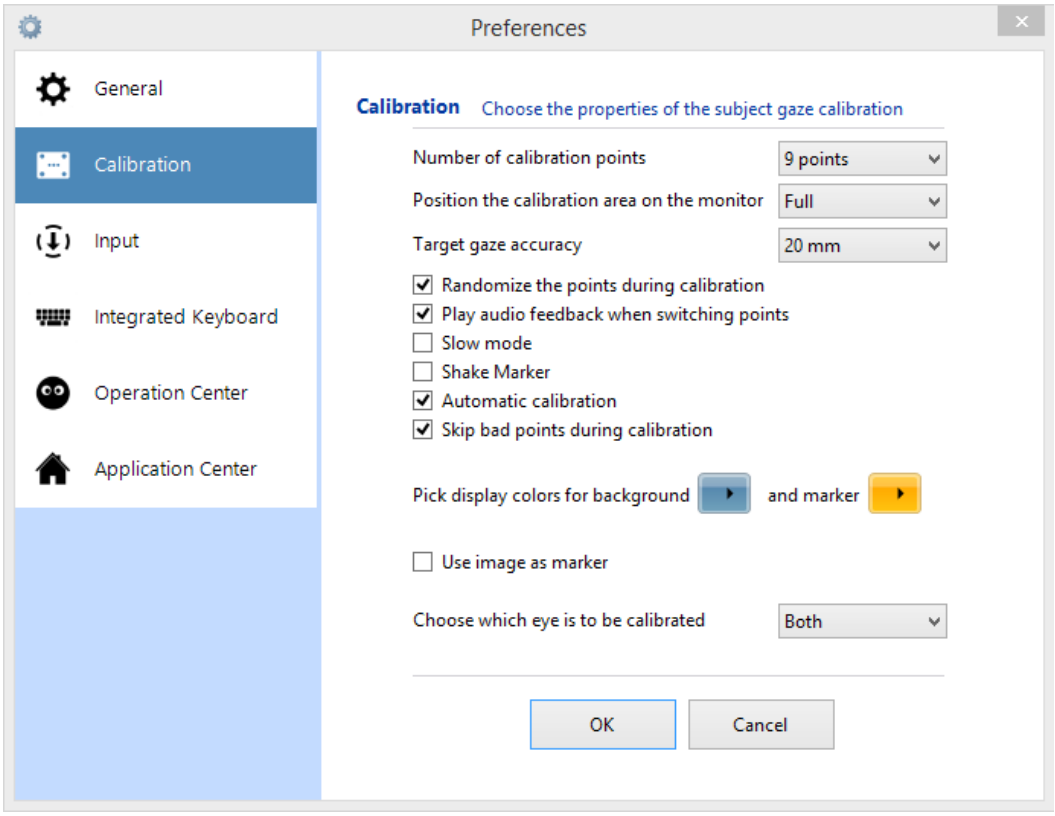
A calibration requires the subject to fixate a number of targets on the screen. Typically the system will automatically detect the correct fixation and interactively cycle through the point sequence. The parameters for this process can be configured as described below.

After the calibration, the system will provide an intuitive feed-back about the quality of the calibration.

Once a calibration has been completed successfully, it will be automatically saved and re-used, until another calibration has been completed. This works even over restarts of the system.

In order to achieve and maintain the highest accuracy, we recommend calibrating the user after system changes or longer periods of time. Very large changes in ambient illumination might also be compensated by a new calibration run.

The parameters of the calibration can be configured under: → Options → Calibration



Calibration Parameter	Values, defaults	Description
# of points	1, 5, 9, 16	Number of points in calibration sequence. A higher number can increase the accuracy. The 16 points calibration is optimized for highest accuracy. Head movement range is limited with 16 point calibration. This method is designed for ALS users who want to control the Windows desktop.
Target gaze accuracy	10, 20, 30, 40 mm	The accuracy that a particular subject can/should achieve. The parameter does **not** influence the actual accuracy, but is only used for qualitative calibration feedback, e.g. even a user with impaired eye movement control can get 'good' results, when the target accuracy is lowered.
Randomize points	Y / N	Changes the point sequence randomly to avoid prediction artifacts.
Play audio	Y / N	Sound feedback with point acceptance.
Slow mode	Y/ N	Slows down the automatic calibration process.
Shake marker	Y/ N	Shakes the marker after it moved to a new position to help attract users attention at this position
Automatic calibration	Y / N	Cycles through the point sequence automatically, checking proper fixation on each point. When turned off, the operator has to accept each point manually. *ESC will cancel the calibration sequence at any time.*
Skip bad points	Y/ N	After a while a non-fixated point will be ignored and the sequence will continue. When turned off, the system will wait indefinitely for a proper fixation.
Pick display colors	n/a	Colors for the calibration screen and targets. *Please pick the calibration background colors close to the future operation scenario, in order to avoid gaze calculation artifacts through large pupil dilation changes, I.e. calibrate on dark background, when the operation environment will be dark.*
Use image marker	Y/ N	Instead of the animated dot, a picture can be used as calibration target, which can be particularly useful when calibrating children. A dialog will allow the selection of a JPG, BMP or PNG image. The size shall not exceed 256x256 px., color of the pixel 1,1 will be treated as transparent image color.
Position calibration area	Bottom, Center, Full, Horizontal, Vertical	Very large screens or visually impaired subjects might require on calibration only a part of the screen. *In most cases, the 1-point calibration on 'full-screen' will yield similar results to a reduced calibration are . Horizontal and Vertical options are only available with 5-point calibration.*
Choose which eye to calibrate	Both, Right, Left	Selects which eyes will be used for the calibration.
Ignore r/l eye completely	n/a	When only one eye is selected for calibration, the option to completely ignore the other eye comes up. The second eye should only be completely ignored, if it's permanently invisible, i.e. an eye-patch is being used.

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Overwrite Calibration

When calibrating both eyes the systems stalls at each point until data from both eyes is available. This ensures the maximum data quality sacrificing tolerance to unstable data. Some users can not be calibrated because there will be points where at least one eye is not visible or unstable.

Pressing the **space bar** overwrites that calibration point. The system now relieves the strict data acceptance and calibrates the point with whatever data is available at this point.

The calibration overwrite routine can also be used for user with problematic glasses. Pressing the space bar will force the system to accept data which would be rejected under normal calibration.

Calibration Profiles

A calibration can be saved for later usage. This is especially useful when working with several users on a system and the calibration is difficult to achieve. Using Load and Save Calibration you can very easily switch between calibrations. Beside the individual calibration data, the profile contains all settings of the calibration procedure.

Use the IntelliGaze Operation Center to access this function:

Button	Function
	Load calibration profile
	Save Calibration profile

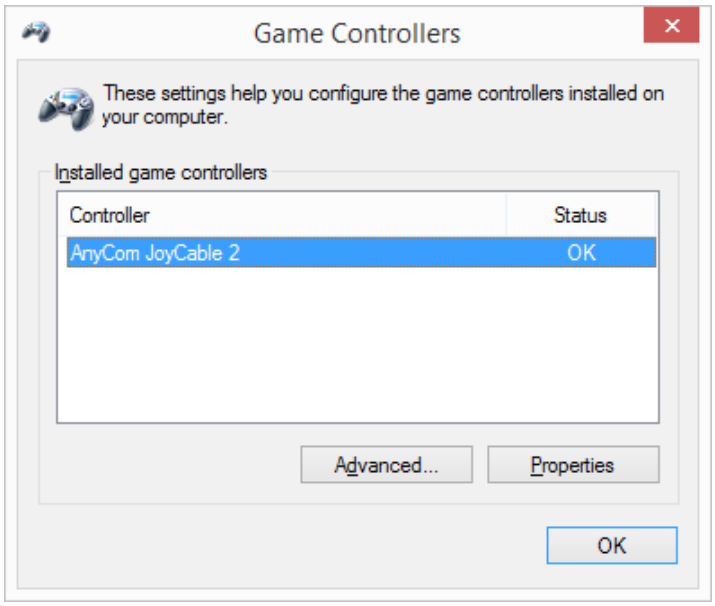
The calibration profiles are shared with the Gaze Assistant tool, where several management functions are provided.

6.5.3 Input

Clicks and other IntelliGaze actions can be triggered with dwell, blink, switches or keys. There are different channels for triggers which can be used simultaneously. The primary trigger can be dwell, blink, switch or key. The secondary trigger can be blink, switch or key. The action will be triggered is determined by an application profile.

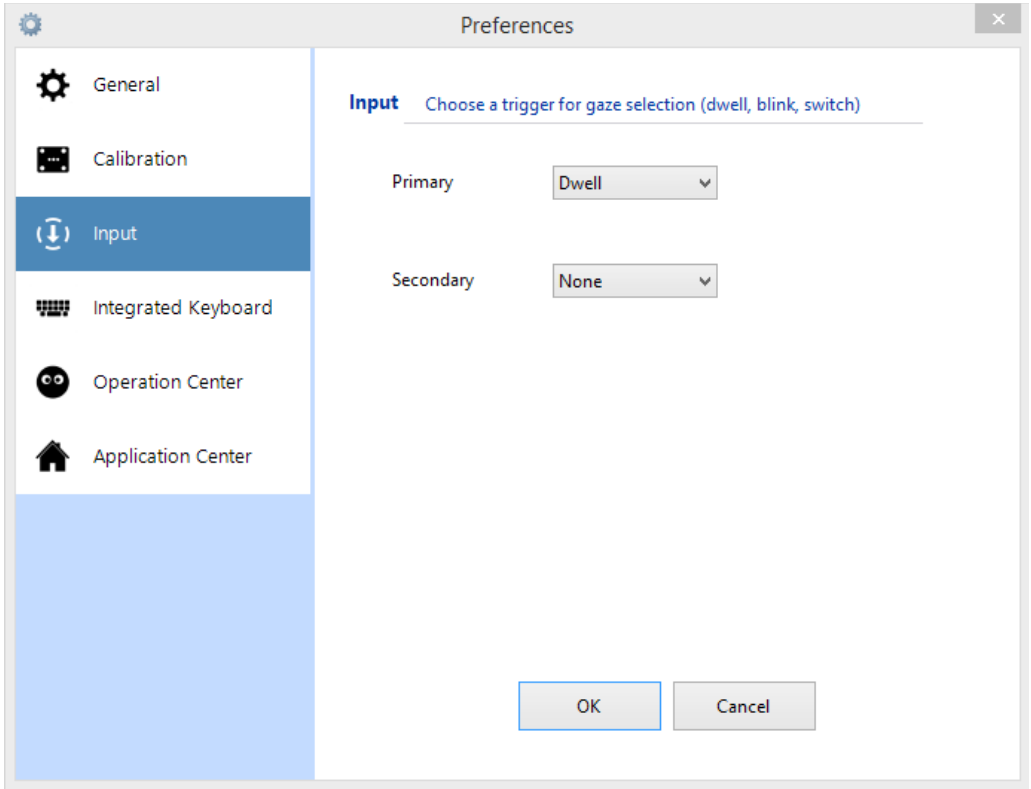
Some external switches generate physical key presses rather than Windows joystick button click events. Choose "key" as trigger input and define which key is to be used.

To check if your hardware can be used as switch (Windows USB joystick) run the following windows program. "setup USB game controllers". You device should appear in the list if it supports Windows USB joystick. Windows USB joysticks are access as "switches" in the IntelliGaze Input options.



Make sure that a key trigger does not interfere with the application. It's recommended to use the function key F13-F24 if the hardware supports it.

Primary switches always act as "direct click" devices. Holding down the button on the switch will generate a mouse down event at the gaze location, allowing the user to perform a drag and drop action.



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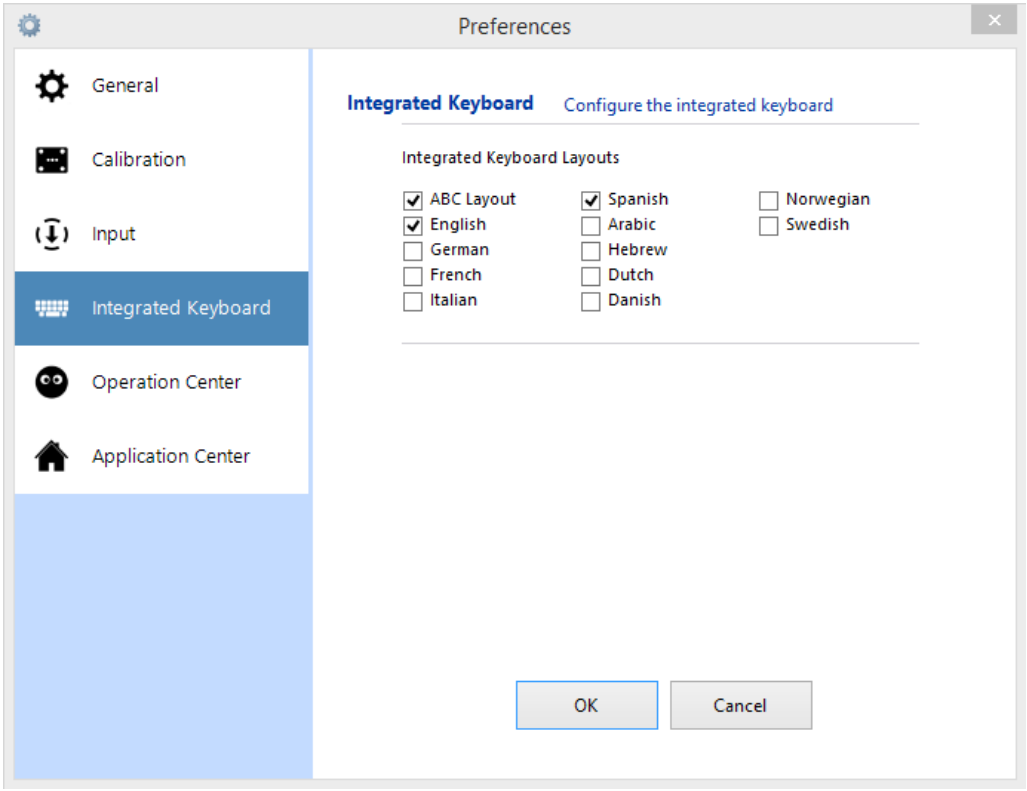
The input triggers will only affect clicks generated by IntelliGaze. When using API applications such as Grid, the click method must be configured there independently.

The actual dwell time is defined per application profile.

6.5.4 Integrated Keyboard

The IntelliGaze desktop control comes with an integrated keyboard. The keyboard layout can be selected on this page. Multiple layouts can be unlocked at the same time. They are switched at run time by the user.

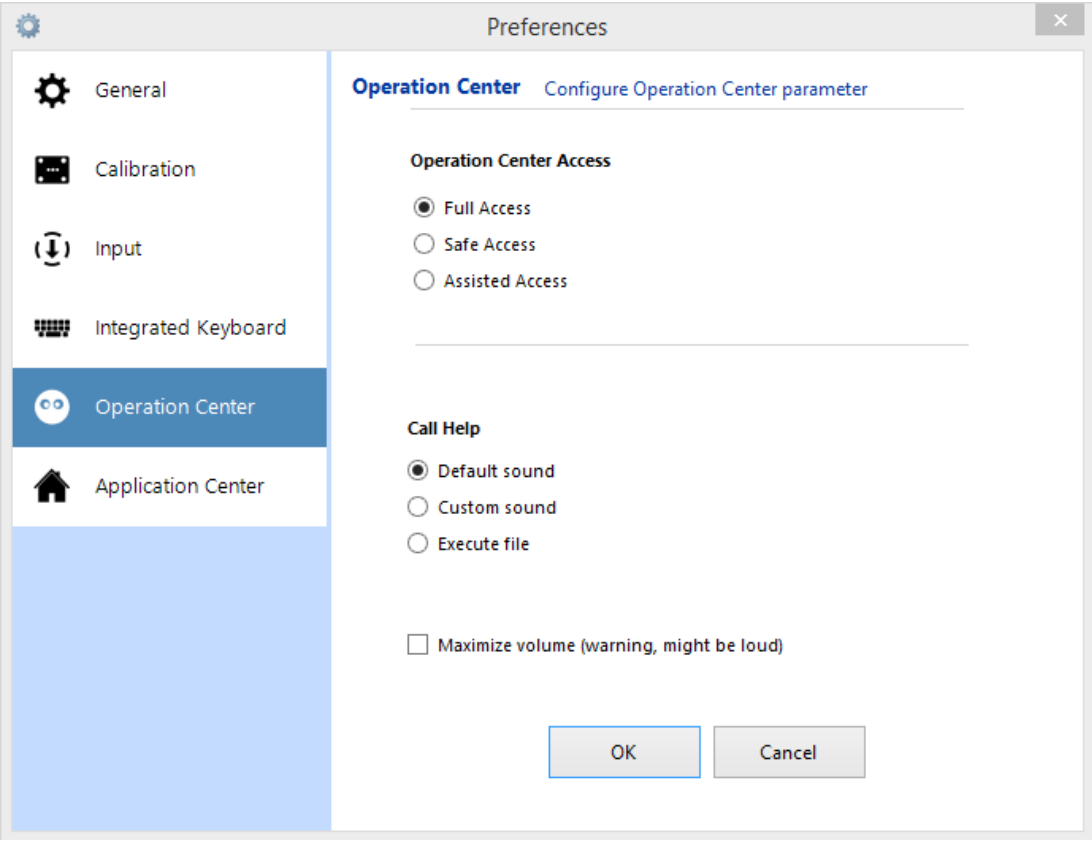


6.5.5 Operation Center

The operation center can be configured to be support a specialized operation mode. Refer to chapter 5.6.Operation Modes. The IntelliGaze license determines which operation modes are available.

The call help options define which actions are performed if the user clicks the help button in the operation center.

Button	Effect
Default Sound	A standard sound is played at maximum system volume
Custom Sound	A sound file must be chosen which is played at maximum system volume
Execute File	A batch file must chosen which may trigger any additional actions such as sending a text message or trigger an environmental control command.



6.5.6 Application Center

In the Application Center (AC) options you can configure the appearance of the AC. Each application will appear as button on the AC homepage which is available in the "Safe Access" of the Operation Center.

You can also decide which background you want on the application center homepage.

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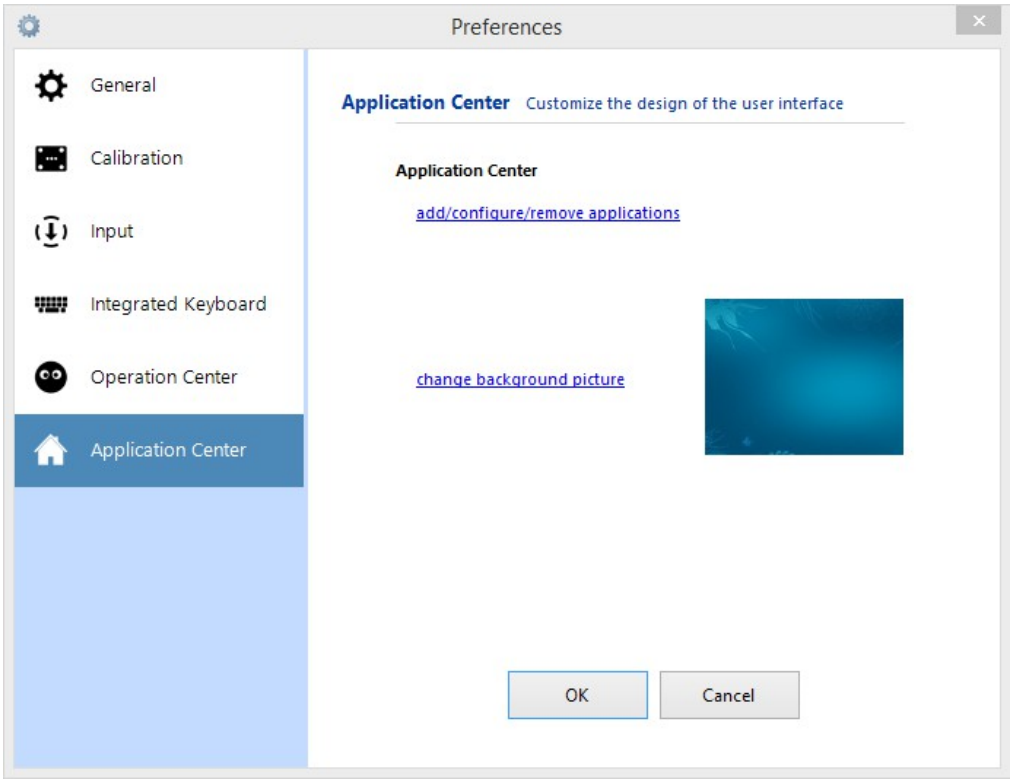
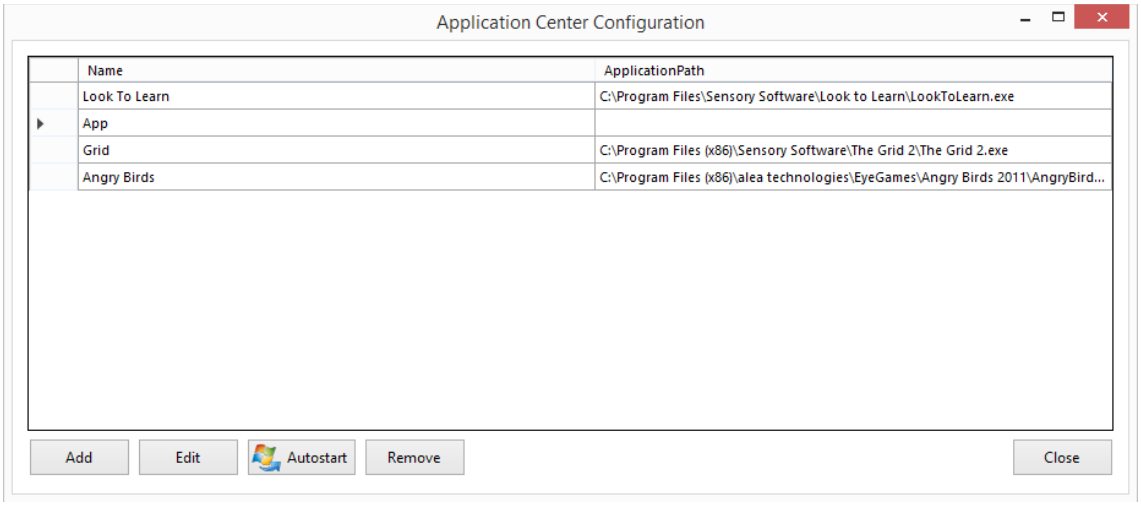


Application List

The Application List gives you an overview of how many application are AC controlled. An application can be started by looking at the application button on the AC. The buttons are displayed from left to right in the order of the application list.

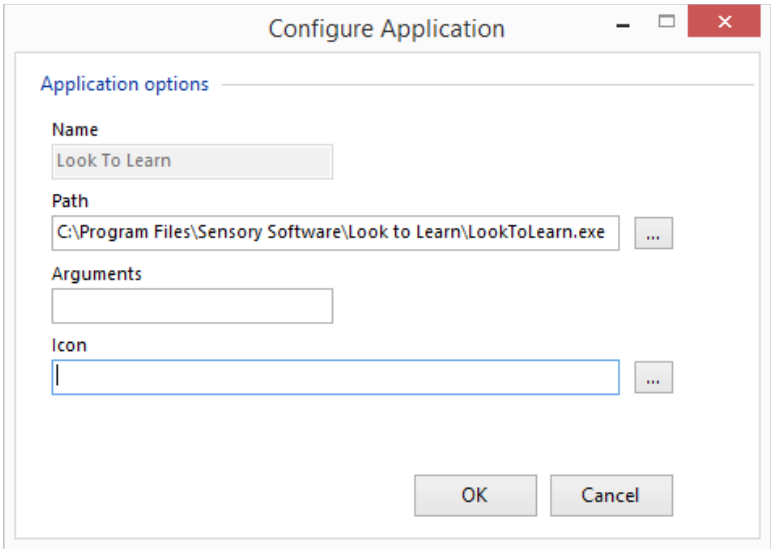
Example application list:



Parameter/ Option	Values, defaults	Description
Add	n/a	Opens a dialog to create a new AC controlled application
Edit	n/a	Opens a dialog to edit the application that is selected in the application list
Autostart	n/a	Defines the selected application as autostart. Once started, IntelliGaze will launch this application directly.
Remove	n/a	Removes the highlighted application from the application list

Add/Edit Application

This dialog allows you to configure application arguments which are applied when the application is launched from the AC.



App.Center Parameter / Option	Values, defaults	Description
Name	n/a	When creating a new application, you can choose a name for the application. This name will also be shown on the button in the AC. This box is grayed when an existing application is edited. This name must be used as an Intelligaze.exe command line parameter when you want to autostart this application together with IntelliGaze™.
Path	n/a	The full path to the program executable.
Arguments	n/a	Program arguments for starting the application. *If you want to launch a browser application enter your favorite browser in the path edit box and the URL to the browser application in the arguments edit box.*
Icon	n/a	Pick an icon which will be displayed on the button in the application center. If left empty, IntelliGaze™ tries to extract an icon from the executable.

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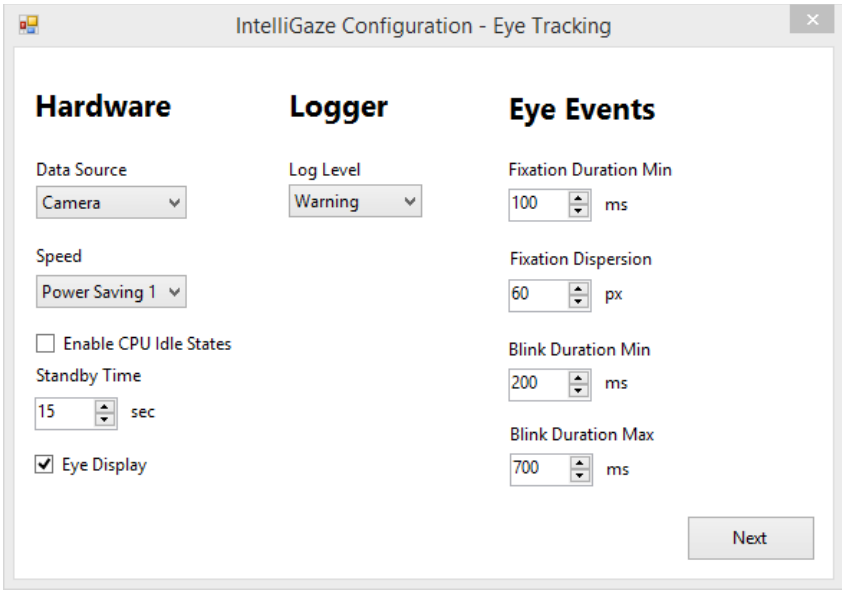
6.6 Service Mode

The Service Mode allows the adjustment of internal system parameters by the experienced system integrator.. It can be invoked by starting "IntelliGaze-Service" from the Program Menu.

The Service-Mode is not meant to be used by the end-user!

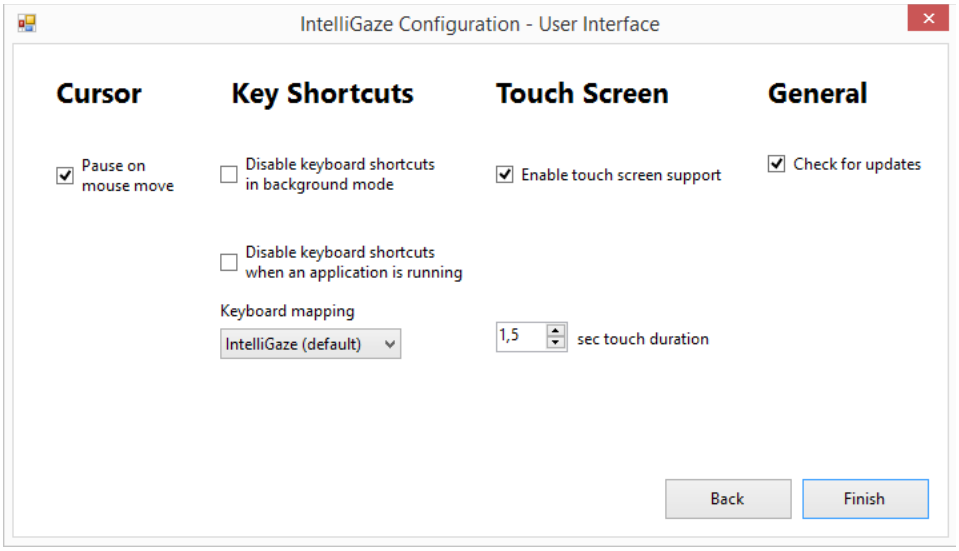
SERVICE-Mode - The program link should be deleted before delivery.
It can easily be recreated: the Service Mode is internally linked to starting intelligaze.exe with a command-line parameter 'service' - i.e. RUN: "intelligaze.exe service"



Eye Tracking Parameter	Parameter	Default Value	Description
Hardware	Data Source	Camera	Choose whether you want to operate the system in mouse simulation mode or in standard camera mode
	Speed	40Hz	Recommendation: 50Hz for real time applications like games (CAM30 only) 30Hz for computers at the lower end of the hardware recommendation Power Saving 1 for the Tablet PCs to optimize battery lifetime.
	Standby-Time	15s	The device will power down to an energy saving mode when there is no head in the working range for the given amount of time
	Eye-Display	-on-	When turned on, you can activate an eye display in IntelliGaze™. The eye display might help to solve problems that occur when dealing with glasses
Log	Log-Level	Warning	Chooses the debug level of the application. When set to verbose, the system will write all internals into the logger; when set to error, only error message will be logged.

Eye Tracking Parameter	Parameter	Default Value	Description
	Log-Type	Logfile	Determines the output of the logger. UDP: logs text messages to 127.0.0.1:2351 LogFile location: /MyDocuments/alea_technologies_gmbh/IntelliGaze/logfiles
Eye-Events	Fixation Duration Min	100 ms	The minimum fixation duration of the build in fixation detection algorithm.
	Fixation Dispersion	60 px	The maximum dispersion of the fixation of the build in fixation detection algorithm
	Blink Duration Min	200 ms	The minimum blink duration of the built-in blink detection algorithm
		700 ms	The maximum blink duration of the built-in blink detection algorithm. All blinks longer then this number are regarded as "no data available"

The Speed Option "Power Saving 1" offers unique power optimization to maximize the battery lifetime on tablet pcs. It's recommended to use this mode when a tablet pc is operated in a mobile setup without mains power.



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User Interface Parameter	Parameter	Default Value	Description
Cursor	Delay	200 ms	The mouse cursor is delayed with a rubber-band effect for the given amount of time.
Key Shortcuts	Disable Background	false	When true, IntelliGaze™ will disable all keyboard shortcuts when IntelliGaze™ is started with the "background" parameter
	Disable Application	false	When true IntelliGaze™ will disable all keyboard shortcuts when an application is launched from the application center
Keyboard mapping	IntelliGaze™, Rolltalk, Custom	Intelli-Gaze	Defines the set of key shortcuts which are used by IntelliGaze™
	Disable Application	false	When true IntelliGaze™ will disable all keyboard shortcuts when an application is launched from the application center
Touch Screen	Enable Touch Screen support	false	When activated IntelliGaze™ will bring up a menu for system function whenever the touch screen is touched
	Detect		Activates the auto-detection function of the touch panel
	Touch duration	0.5sec	Delay before the menu pops up after a touch event
General	Check for updates	True	Checks for online updates when you start IntelliGaze™

7 Adapting IntelliGaze to Different Applications

7.1 Blickfang™ Concept

The measured gaze is never 100% accurate and stable because of measurement tolerances and the physiology of the eye. A gaze cursor that is directly coupled to the measured gaze will distract the user and create additional errors because the eye tends to follow moving and jittering target rather than staying focused on the real content of the screen.

IntelliGaze uses a technology to snap the gaze cursor into elements. This works not just for controls in IntelliGaze but also in some selected Third party applications.

Additionally, the Blickfang technology is employed by Desktop 2.0 to use the snap in function on any arbitrary Windows application that supports the so called UI-automation. The so called "decoupled cursor" is required to apply the snap in behaviour of the cursor.

Blickfang greatly enhances the user experience and it is recommended to make use of it wherever possible.

Gaze Cursor, floating between elements.

Cursor with Blickfang, centered on elements using Desktop 2.0:

Application	Blickfang Activation
IntelliGaze	- always on
Desktop 2 (decouple mouse cursor behavior)	- always on
Grid2	- integrated in Grid2, no Intelligaze Blickfang is used

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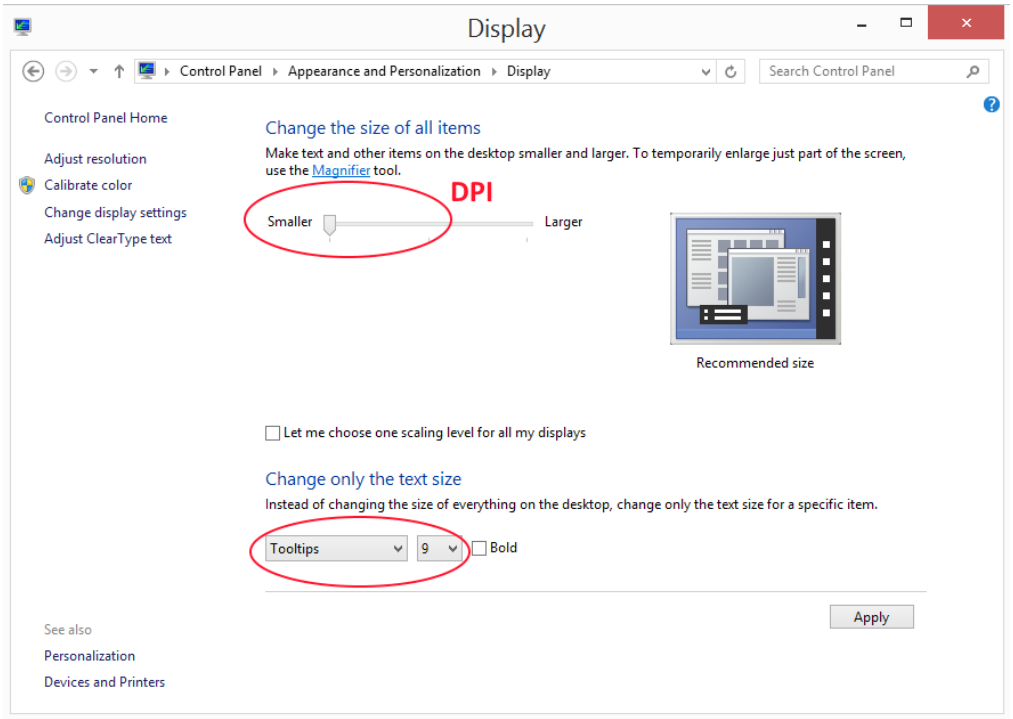
7.2 Windows Desktop Settings

The control of the Windows desktop poses a particular challenge to gaze interaction users. Enlarging the elements of the graphical user interface can help to substantially improve the user experience when relying on pure mouse cursor emulation.

The desktop settings on Windows 8 can be adjusted, as follows:

Control Panel\Appearance and Personalization\Display\Screen Resolution | Make text and other items larger or smaller


Display
Control Panel ▸ Appearance and Personalization ▸ Display
Search Control Panel
Control Panel Home
Adjust resolution
Calibrate color
Change display settings
Adjust ClearType text
Change the size of all items
Make text and other items on the desktop smaller and larger. To temporarily enlarge just part of the screen, use the Magnifier tool.
DPI
Smaller
Larger
Recommended size
Let me choose one scaling level for all my displays
Change only the text size
Instead of changing the size of everything on the desktop, change only the text size for a specific item.
Tooltips
9
Bold
Apply
See also
Personalization
Devices and Printers

Recommended Settings (based on 12"..15", 1280x800 screen-size) :

Parameter	Value
Title Bars	16
Menus	12
Message Boxes	12
Palette Titles	14
Icons	12
ToolTips	12

Grid2 supports only a DPI setting of 125%. If you intent to use Grid2 make sure to not make the DPI settings larger than 125%.

7.3 Application Center - General Considerations

The purpose of the Application Center is to provide an easy, central home-page, where 3rd-party applications can be easily started and stopped.

Some options include:

- Switch between two applications without starting them from the Windows desktop
- Start online resources directly by starting a web-browser with additional parameters.

The applications grouped in the application center can be standard desktop applications, modern UI store apps or API applications such as Grid2.

If there is a profiles for the application it will be automatically applied when the application is launched from the application center.

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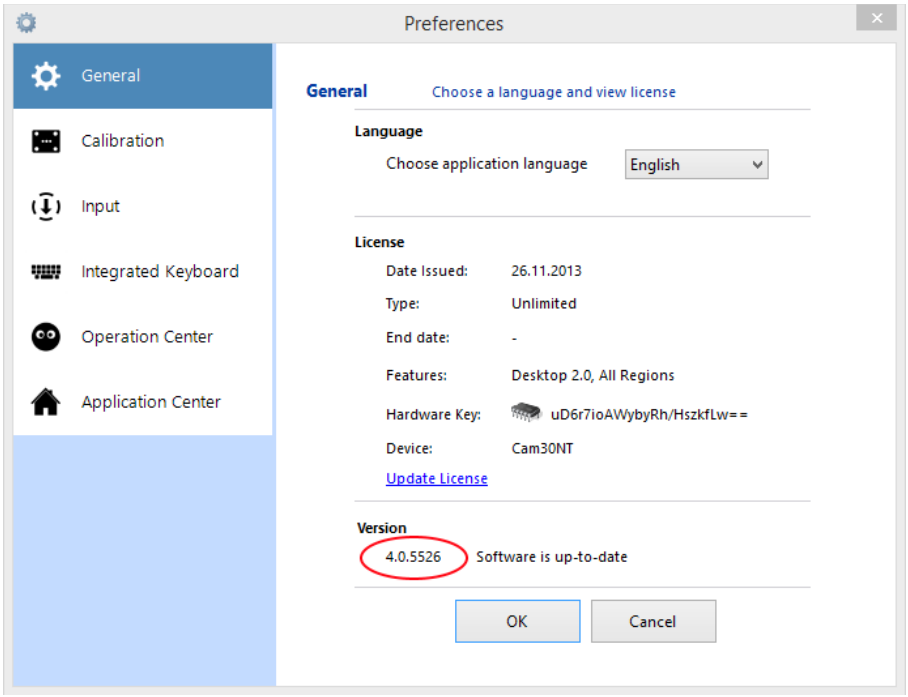
8 IntelliGaze Software Update

You can check the version of IntelliGaze™ under Options → General.



8.1 Update from CD

If you intend to update to the newer version from a CD, just run the setup.exe of the newer version. The installer will replace the outdated files automatically.

Please read the release notes of the new version to find out whether an update is advisable.

8.2 Online-Update

IntelliGaze from v.1.2 onward additionally provides an online update function. Software version below 4 will not be updated to version 4 with the online update. Manually update versions below 4.

IntelliGaze Options → General: "Show details" will open the update dialog and provide you with the Release Notes of the new version. This link is only available when a new update is available.

Please read the Release Notes of the new version to find out whether an update is advisable.

Clicking "Download and install" will then execute the update automatically. The execution of the online update does require Windows administrator rights!

The check for online updates can be suppressed in the Intelligaze Service Mode

9 Gaze Assistant

9.1 General

The Gaze Assistant is wizard-like tool to measure and protocol the gaze interaction capabilities of a user. It also helps the caretaker to set up the system. It splits up the setup process into small well defined steps that help to identify problems early.

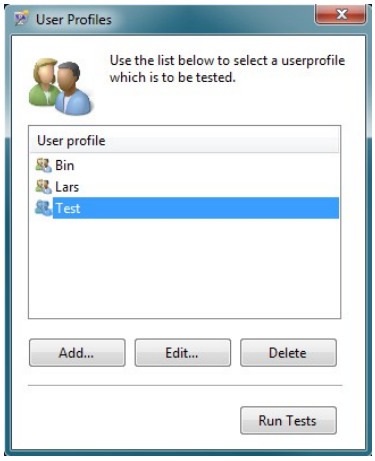
The Gaze Assistant does not require an a user specific gaze calibration..

9.2 Usage

9.2.1 User Profile Selection

Create a user profile for a user. You can have several profiles per user if you want to switch between tests for different glasses in example.

The user profiles are shared with the IntelliGaze calibration profiles. Each user calibration created with the gaze assistant is also available in IntelliGaze under "Calibration Profile/Load"



Group	Description
Add	Creates a new user profile. All settings and results are saved per user.
Delete	Deletes the highlighted profile
Run Tests	Performs the test for the highlighted user

9.2.2 Target Selection

In this step of the wizard you can define a gaze target for the user. This target will be used later in the test as well as in the calibration.

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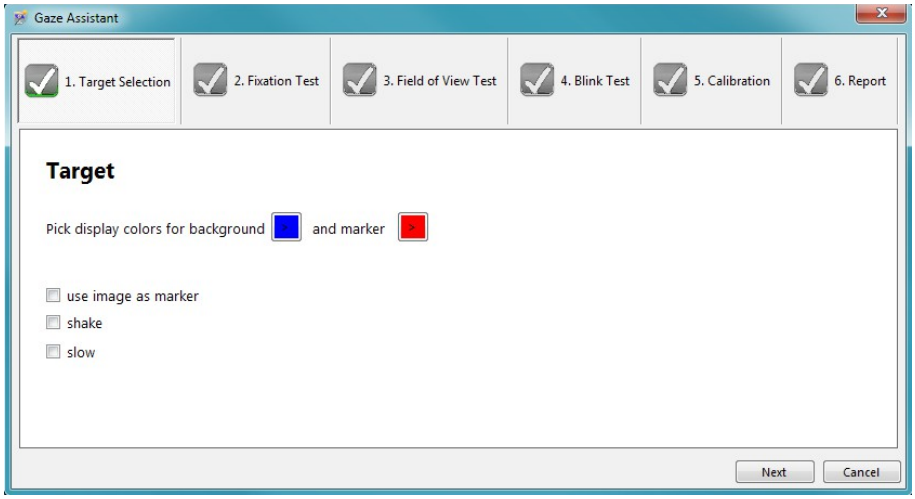
The target selection is a fundamental part of the set up process. A target / contrast / image that can only be poorly seen by the user will result in a poor performance. When working with children it's recommended to use a picture to draw their attention to the gaze target.

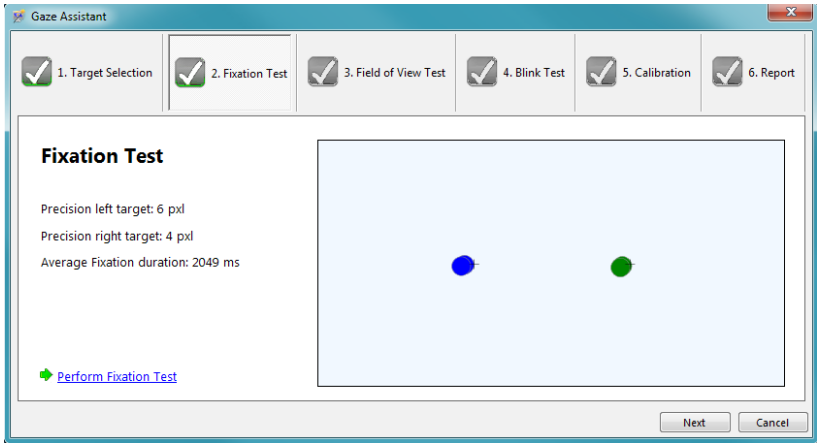


Target Selection	Default Value	Description
Colors Bgnd / Target	Blue / Red	Defines the color the background and the target during the following tests. The contrast should be high
Use image as marker	off	Use an image instead of a point as gaze target
Shake	off	Shakes the target whenever it's moved to a new position to draw the users attention
Slow	Off	Moves the target much slower to help users with a weak cognition to follow the target

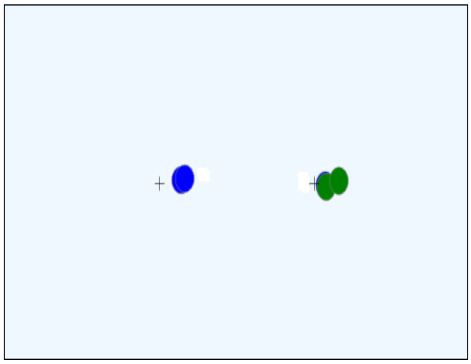
9.2.3 Fixation Test

The fixation test evaluates the previous target selection if the user is capable and or willing to look at the target. This tests confirms that there is some kind of reaction of the users to the target. It can reveal brain neglects as well as visual impairments.

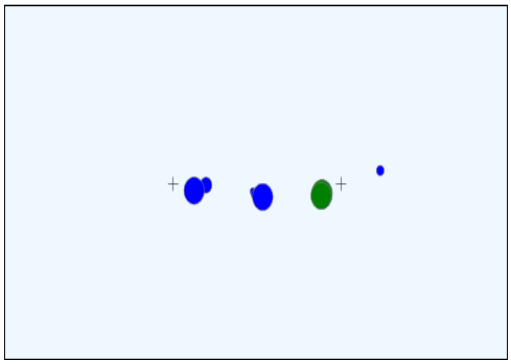
The test will switch the gaze target between two spots on the monitor and repeat this three times. It will measure if the eyes meaningfully respond to this stimulus change.



Fixation Test	Parameter	Description
Precision	OUTPUT: Left / Right	A low value < 100 px indicates that the user did react to the left or right stimulus.
Average fixation	OUTPUT: ms	How long was the user able to fixate the targets. This value a also an early indicator how long the maximum dwell time should be
Perform Fixation Test		Starts the test.



Good – clear reaction on both spots



Bad – arbitrary reaction on the left spot

Gaze-Ass. Hotkey	Function	Comment
Enter	Starts the test	
Escape	Interrupts the test	

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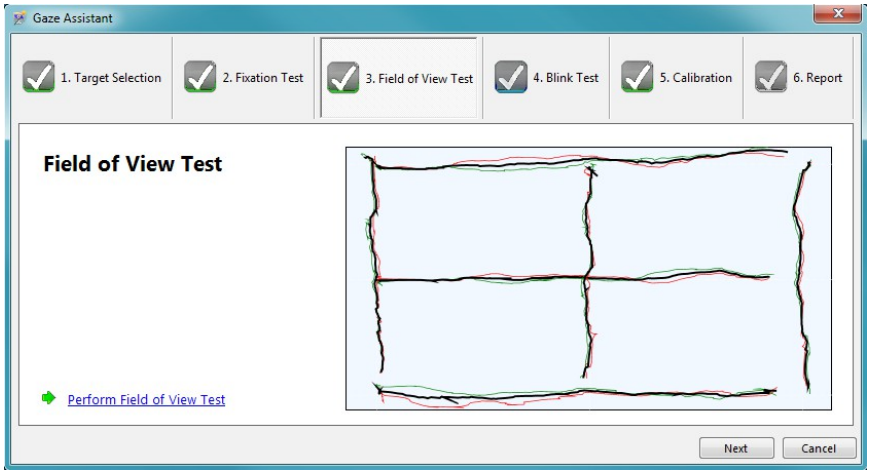
If the Fixation Test fails its recommended to go back to the target selection page, choose a different target and repeat the fixation test to check if this helps the user to react to the target better.

9.2.4 Field of View Test

The Field of View Tests evaluates if the users is able to react to the gaze target on every critical position of the screen. The test confirms that the users reacts to the target on several screen positions and there are no eye tracking problems in that position. The test is binocular therefore it's possible to identify the problems per eye.

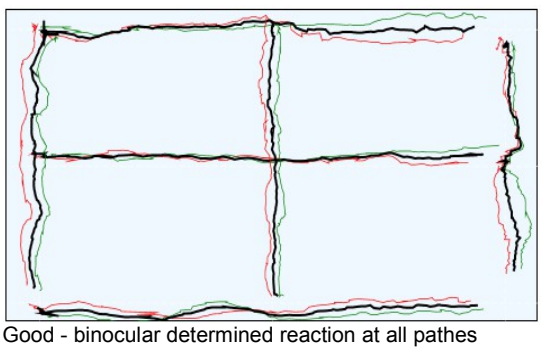
The test will move the gaze target across several lines on the screen. The user is supposed to follow the dot while the system measures the eye movements during that process.



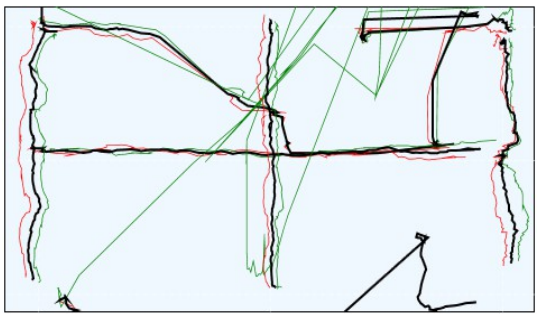
As a result you will get a visual representation of the scan path per eye.

FOV-Test	Parameter	Description
Red line	Left eye	Scan path of the left eye
Green line	Right eye	Scan path of the right eye
Black line	Combined eyes	Scan path of the intelligent gaze combination of left and right eye.

The lines don't have to be very accurate. The test is supposed to reveal a meaningful reaction to the moving gaze target. A meaningful reaction is a straight line, no matter where the line is.



Good - binocular determined reaction at all pathes

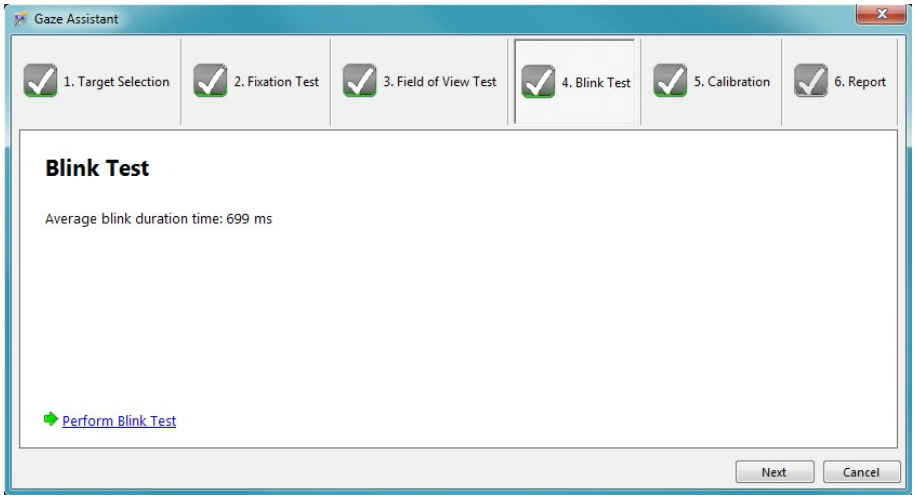


Bad - tracking problems or no reaction on the upper and lower path

Hotkey	Function	Comment
Enter	Starts the test at the chosen position	
Escape	Interrupts or ends the test	
1-6	Select a position to start a scan	Very often it's enough to just test the outer lines (1,3,4,6)

9.2.5 Blink Test

The blink test measures the user's blink behavior. During the test the user is supposed to look at the target and perform a couple of blinks he would use to trigger actions with the eyes. The system will measure the average blink duration.



The blink test gives a recommendation for the minimum blink duration that should be used by IntelliGaze or a third party communication software to trigger clicks with eye blinks.

Hotkey	Function	Comment
Escape	Interrupts or ends the test	

9.2.6 Calibration

The calibration test allows the user to perform a calibration with the settings that where found in previous tests. Decide for the number of points, the calibration area and the eye that needs to be calibrated according the field of view test.

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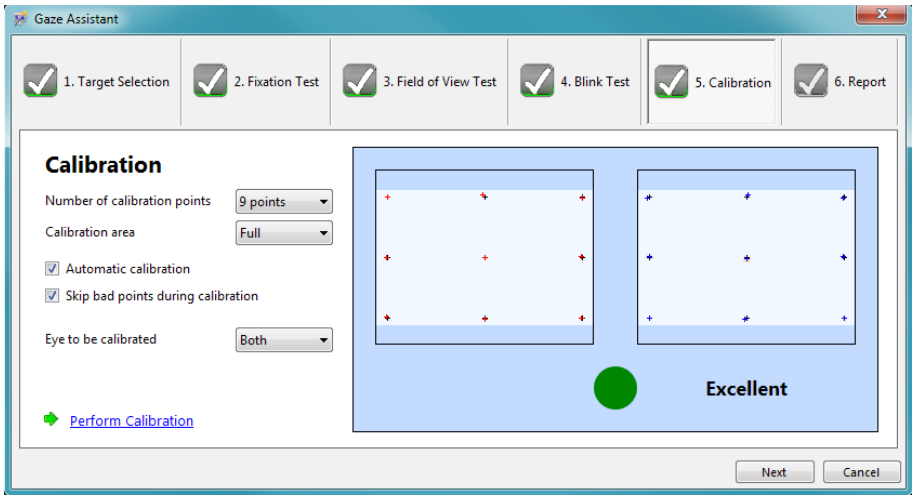
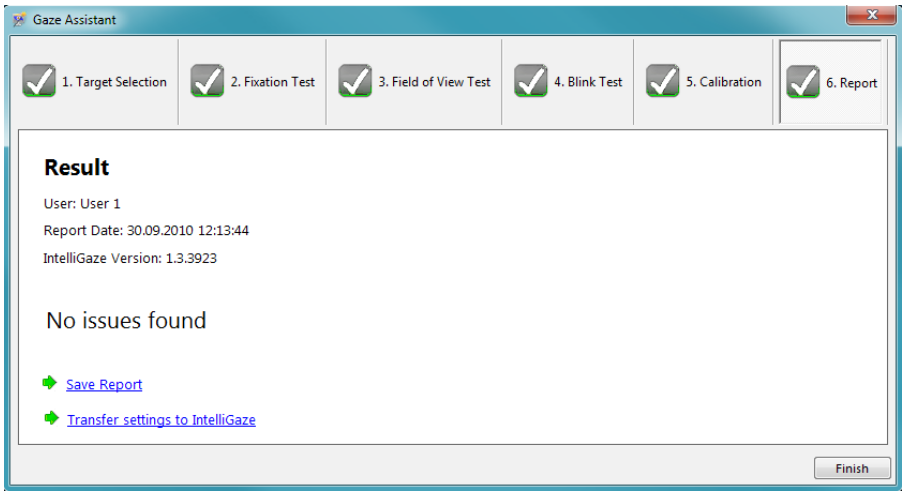


The calibration will create the first user specific calibration. Previous test will very often perform better after the first user specific calibration because the system now doesn't rely on a default calibration to measure the gaze anymore.

9.2.7 Report

The report gives a short summary of the test. It's possible to export the result to an XPS document. The results itself are stored automatically. After quitting the Gaze Assistent and opening the same user again all results are in place.



The XPS-viewer is pre-installed on every Windows Vista (and higher) system and will also be installed with the .net 4.5 framework which comes with later IntelliGaze versions.

Group	Description
Save Report	Export all test results to a XPS file.
Transfer settings to IntelliGaze	Pushes all settings for calibration and target to IntelliGaze.

10 Troubleshooting

10.1 General

10.1.1 System is not tracking

Definition

The tracking status Monitor constantly displays 'X' - It is not possible to achieve any positive tracking feed-back from the Tracking Status Monitor.

Prerequisites

- IntelliGaze™ installed
- Camera unit connected via USB
- External power-supply connected (CAM30)

If you still have problems with the tracking record a 10-20sec eyevideo using the keyboard shortcut Ctrl+R. Alternatively you can open the calibration page of the operation center and click the status windows to create and eye video or snapshots.

The video is located in the folder

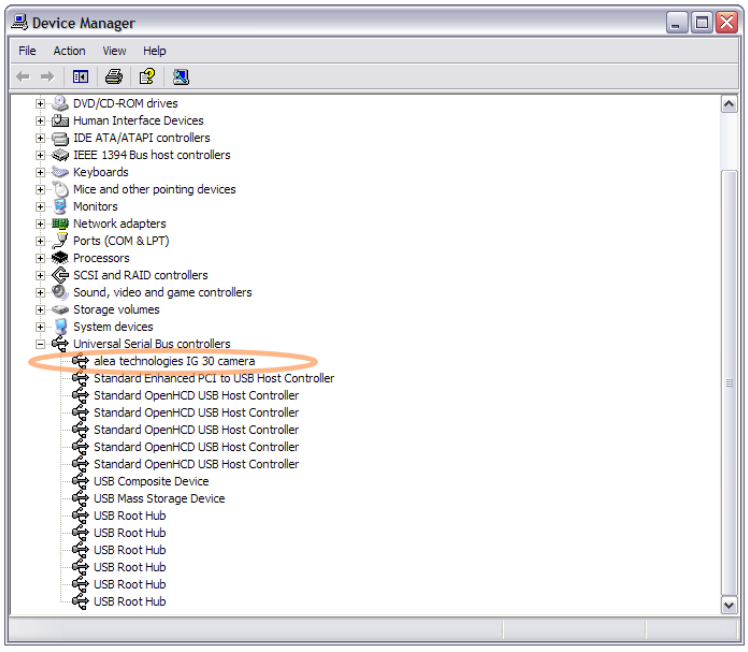
[users documents]\alea_technologies_gmbh\IntelliGaze\eyevideos

Send the video to alea technolgies using dropbox or a similar service.

10.1.2 Intelligaze cannot detect camera on start-up

Check proper installation and connection of the camera

Whenever the camera's USB cable is connected to a properly installed PC, the camera will show up among the USB devices in the control panel:



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If the camera is not shown as above run the tool reinstall driver which is located in the IntelliGaze folder/driver.

10.1.3 'Measure the monitor before calibration error'

Definition

The system requires a proper monitor calibration before it can calibrate a subject. Changing the monitor resolution or the camera position with respect to the monitor invalidates the monitor calibration.

Solution

Launch the tool MonitorCalibration and make sure that the physical screen dimensions and the monitor resolution match your setup.

10.1.4 Dwell click is never triggered

Problem

Although the subject is properly fixating on a point, the dwell cursor never comes to an end and resets itself.

Analysis 1

Some USB devices like memory sticks or external hard-disks allocate too many shared USB resources. The CAM30 data transfer might be interrupted by these devices resulting in an irregular video transfer which finally disturbs the eye event detection. Remove external memory sticks.

Solution 1

In general, other USB devices like web cams, speakers, headsets are not a problem. Please select hardware combinations carefully and, if problems occur, consider moving other devices to a different USB port.

Analysis 2

The data is too noisy for proper fixations to be detected, or the detection parameters are miss-configured.

Solution 2 – Software setting

The fixation dispersion is set to a value which prevents proper fixation detection. Increase this value.

10.1.5 IntelliGaze crashed

Definition

The IntelliGaze software crashes.

Solution

IntelliGaze has a build in crash recovery restarting the software after a crash to be able to control the pc. However to understand what the reasons of the crash are and to find a solution for that it's helpful to inspect the crash log files. They can be found in the folder

[users documents]\alea_technologies_gmbh\IntelliGaze\crashreports

10.2 Hardware

10.2.1 Cleaning system components, CAM30

Housing

Do not use any harsh solvent!

We recommend that you use a cleaner specifically designed for electronic equipment to clean the case. This should be used in conjunction with a soft, lint-free cloth. Any cleaning solution should be applied to the cloth. Under no circumstances should you spray the cleaner directly onto the machine. Excess cleaner may find its way into sensitive areas of the machine and can cause severe damage.

Lens

Do not use water in any combination with soap or alcohol!

Do not use any harsh solvent !

If the lens cover is being used for transport and storage, there should be no need to clean the lens. In the unfortunate case, of dirt reaching the frontal lens, the lens can be cleaned very carefully. Use lens cleaner and cleaning tissues that are certified for optical instruments or glasses.

10.2.2 Cleaning system components, CAM30NT

Front plate. IR-transmissive acrylic glass: Please use only soft cloth, i.e. microfiber and avoid harsh cleaners.

IR-Filter, 'Small Mirror': Dirt may be removed with glass cleaner or better isopropanol. The use of a cotton swab is recommended.

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10.2.3 Check and adjust lens focus (CAM30)

Lens-marker with focus (above)
and iris (below) calibration mark.

How to identify and fix a possibly miss-adjusted camera lens ?

The camera lens has been calibrated and screw-locked during production. Two small scratches mark the calibration position. If uncertain whether or not the lens has been miss-adjusted, check for the position of the scratch-marks. If the lens-rings have been moved, open the appropriated locking screw* slightly, move the ring so that the marks are properly aligned again and lock the screw carefully.

(* - requires 0,9mm allen/hex key.)

After the procedure, the system should be tracking again in the specified working range. If further problems occur, please contact alea technologies.

10.2.4 Software

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11 Notes